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THE CANADIAN MINING JOURNAL

1922

Index To Vol. 43

Published Weekly by the Industrial & Educational Publishing Co., Ltd.
at the Garden City Press, Gardenvale, Quebec.

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EDITORIAL

ADVANCEMENT OF SCIENCE.

The fact that the American Association for the Advancement of Science selected Toronto as its meeting-place last month should give a much-needed impetus to the cause of scientific research in this country. The last fifty years have witnessed enormous strides in scientific development and in the application of scientific discoveries and inventories to commercial and utilitarian purposes. The aeroplane, the motor-car, the telephone, electric lighting, wireless telegraphy—all these inventions (and many others) have taken place within the past half century.

But much yet remains to be done in the domain alike of scientific research and of its practical application to industry. The war, it is true, gave to the chemist and the physicist unexampled opportunities for research work of which they were not slow to avail themselves. Some of the discoveries made under the stress of war are already showing themselves of well nigh inestimable value to those engaged in the pursuit of peace. But of the scientist's thirst for knowledge it may truly be said that "*Vires acquirit eundo.*" The more he learns, the more he becomes conscious that there is still much more that, if he is to be faithful to the light within him, he must yet seek to know. And it is well—vastly well—for the progress of the world that it should be so. For in the life of the researcher there is no failure except ceasing to try.

Sir Robert Falconer, president of Toronto University, addressing the members of the American Association for the Advancement of Science, emphasized the desirability of wealthy institutions and individuals becoming sufficiently interested in the cause to establish endowments for the advancement of scientific research generally. No doubt it is to be desired that such should be the case. But at the same time the Government should address itself in earnest to the task of aiding research work. Last year, members of the House of Commons passed the Research Institute bill which, modest as it was, gave considerable promise of being a real help to those engaged in scientific research. But, although the bill was a Government measure, it was met with a point-blank refusal to pass it at the hands of the Senate. It appears that this ill-advised action—as we feel bound to consider it—on the part of the Senate was based on economical grounds. But if such grounds were really the basis of its action, then it offered to the world a glaring example of false economy. And not merely of false economy, but of illogicality also. For it seems to us highly illogical that, at a time when millions upon millions of public money were being expended on the Government railways—which, it might fairly be argued, showed little prospect of becoming self supporting—the Senate should have refused to sanction the expenditure of only $1,000,000—we refrain from calling it a "paltry" $1,000,000, as that war time mode of expression is now happily obsolete—on a project in many ways so essential to the industrial life of the country.

We believe the Senate's action in this matter to have had an adverse effect, be the same more or less, on practically all the big industries in Canada. For with all of them intense concentration on the costs of production was an urgent need, and with some of them a vital need, if they were to maintain their export trade. Moreover, the action in question assuredly betokened a culpably inadequate understanding of the necessity of governmental co-operation with industry under present-day conditions. In almost any European country the comparatively small assistance which was asked for would have been given gladly [illegible] could not fail to help [illegible] stimulate the industrial life of the whole country. [illegible] profound regret that the non-Conservative [illegible]

will lose no time in introducing a bill of similar purport, and that, if it does so, the Senate will show itself more alive to the exigencies, industrial, commercial and scientific, of the days in which we live.

GOLD MINING IN CANADA.

A very interesting review of metal mining in Canada was presented by Mr. Thomas W. Gibson to the Engineering Section of the American Association for Advancement of Science at the Toronto meeting last week. Mr. Gibson's paper is reproduced in this number of the Journal. It will be noted that the production of the several metals reached very large figures: gold $455,617,107; silver $251,292,685; copper $263,529,237; nickel $164,473,403; lead $50,967,802; zinc $18,600,000 being the most notable. These figures give the value of the metals produced up to Dec. 31, 1920 and another years output has already to be added.

The figures will be increased during the coming year by many millions despite the general depression in industry. Particularly promising for the coming year is the gold mining industry concerning which Mr. Gibson has made some important statements. It is worthy of note that there is at least one industry which can at this time be referred to optimistically. Gold mining in Ontario became firmly established during a period of adverse conditions and one may well be confident that it will thrive under the more favorable conditions. Canada has now produced about $470,000,000 in gold and while alluvial mining has declined, the output of lode gold is rapidly increasing. The record of the past few years is a remarkable one, for the conditions were such that gold mining on a profitable basis seemed almost impossible and only a few survived. It is reasonable to expect that other properties will now be developed and that many new producers will appear during the next few years.

Owing to the poor market for metals, the capacity for output of Canada's nickel, copper, lead and zinc mines is not evident from the years' production record; but it is obvious that even under the unfavorable circumstances a considerable output is being made. Gold is, however, in the preferred position now.

RESOURCES OF JAMES BAY AREA.

The Ontario Government's decision to proceed with the construction of a railway northward from Cochrane, is renewing interest in the possibilities of an area that has important natural resources and which on development may soon become of great industrial importance. There are known mineral, pulpwood, fur and trails that make travel fairly easy for the explorer tion and the provision of transportation facilities will lead to the establishment of several industries and the settlement of a country that, while not far distant, is practically unknown to the people of Southern Ontario.

The inaccessibility of the area has hitherto prevented its development. Fur traders and Indians have travelled its highways for generations; but the rivers and and trails that make travel fairly easy for the explorer have not yet developed into busy highways. The building of the railway will bring about great changes. More definite information concerning the resources will now be sought and the utilization of them will not be long delayed.

In the "Toronto Star" of Dec. 24, there is an illustrated article on the area which will be served by the extension of the Ontario Government railway. The writer comments on the potential mineral, agricultural and forest wealth and the water powers.He considers the undertaking to be of great importance and predicts that great good will come from the opening up of this section of the hinterland. We are pleased to note such articles in the daily press, as it is evidence that larger numbers of our citizens are taking an interest in the development of natural resources.

GOLD INCREASING IN VALUE.

There has been in the United States during recent years much dissatisfaction with the conditions under which gold mines were operating. The high costs which have prevailed have made it impossible to derive a fair profit from the business. The force of the arguments in favor of subsidizing the industry has been diminished considerably by the downward trend of costs and the conviction that the problem will be solved by the increasing purchasing power of gold.

In this connection the recent report to Congress by the Secretary of the Treasury is of interest. The Secretary, referring to the McFadden bill said:

"Due to the unfavorable influence of high prices and consequent high costs of production on the mining and reduction of gold, there have been further discussions of proposals for subsidizing the gold-mining industry. A bill has been introduced in the House of Representatives (H. R. 5025) 'To provide for the protection of the monetary gold reserve by the maintenance of the normal gold production of the United States, by imposing an excise, for revenue and other purposes, upon all gold used for other than monetary purposes, and by the payment of a premium to the producers of newly-mined gold, and providing penalties for the violation thereof.' The Treasury does not approve this bill or other measures for subsidizing the gold-mining industry, believing that the problem will ultimately adjust itself and gold mining become more remunerative as the purchasing power of the dollar increases."

The chief producing gold mines in Canada were able to do fairly well during the period of high prices. Production was curtailed and plans for expansion postponed, some mines were forced to close down, development of new properties slackened, costs mounted to dizzy heights and labor became inefficient; but for-

tunately a few mines were able to continue operation and the industry survived. Lower costs will make it possible to mine profitably more and more ore that is now being left in the big mines and which would never be mined at the high costs that have prevailed. Lower costs will also lead to greater activity in developing new mines.

During the past year there has been a notable increase in the value of gold. The cost of other commodities has dropped sufficiently to warrant reduction in wages. With lower cost of living there will be increase in the amount of work that can be profitably done at gold mines and the position of the miner will be bettered. There is good reason for the belief that the gold mining industry in Canada, and particularly in Northern Ontario will grow rapidly during the coming years.

MINERALS IN SASKATCHEWAN.

Regina, Dec. 28.—"Our second annual exploration party into northern Saskatchewan has just returned, and their preliminary report further confirms the general impression that the north country gives promise of great future possibilities," says Hon. C. A. Dunning, Minister of Labor and Industries for Saskatchewan.

"Last year we sent north our first exploration party which, of course, made but a reconnaissance survey of the territory, noting features or formations worthy of further study. This year's party, therefore, was for the purpose of closely studying one of the features selected by last year's party, namely, the Bear Hills district."

Among the more important minerals (metallic and non-metallic) discovered in the vicinity of the Bear or Wapawekka mountains, the last season, by the Saskatchewan Government Survey party can be listed:—

A wide variety of clays and shales, limestone, granite and sandstone for building purposes, small amounts of garnet sand, glass sand, builders' sand, large tracts of bog iron ore, numerous deposits of yellow ochre and other paint materials, and several springs of mineral water.

That the northeastern portion of Saskatchewan is rich in clay and shale deposits for the manufacture of building brick, paving brick, and other lines of structural slay ware is clearly shown by the great beds of Benton shale to be seen at several points. There are exposures of this material ranging in height from 80 to 100 feet of pure shale, without a single band of non clay material intervening, representing millions of tons of structural building material.—Toronto Globe.

SHIPPING NOTES.

By J. J. O'CONNOR.

An important addition is about to be made to the Canadian Lake fleet of bulk carriers, that will aid considerably in bringing back the proper proportion between it and the United States Lake tonnage, as it existed 40 or 50 years ago on the inland waters.

The Mathews Steamship Company, of Toronto, have awarded a contract to the Port Arthur Shipbuilding Company, of Port Arthur, for the construction of lake freighter, 550 feet over all, 58 feet beam, and 31 feet in depth. The contract was signed in Toronto on the 22nd instant, and was announced by the Port Arthur Shipbuilding Company on the 27th.

According to the design, the new ship will be the most modern vessel on either side of the Great Lakes.

She will be of steel construction throughout, equipped with a triple expansion engine, 25½"x41"x67"x42" stroke, the steam being furnished by three Scotch boilers, with three interchangeable Morrison furnaces. The boilers will be 13' 6" in diameter, by 11' 2" in length, allowed 185 pounds pressure. The d.w. capacity will be 12,000 tons, or in terms of wheat, 400,000 bushels.

The construction will be under the personal supervision of Mr. J. H. Smith, of Cleveland, O., formerly general manager of the Port Arthur Shipbuilding Company, and will be built to classify "A 100" at Lloyds, and the American Bureau of Shipping. The contract calls for delivery September 15th, 1922.

Work on this contract will proceed immediately, pattern makers and others will be put to work at once in preparation for the work of construction, and the keel will be laid just as soon as material can be assembled.

This contract will furnish employment for from 800 to 1,200 men constantly from now on to the date of completion, and will be of substantial advantage to the ranks of unemployed and greatly relieve the present situation in both skilled and unskilled labor.

President Whalen states that he is hopeful of securing further shipbuilding contracts in the near future.

At present the plant is chiefly employed in ship repairs, and the manufacture of paper mill machinery, employing 250 men.

BRITISH COAL IN NEW YORK.

New York, Dec. 28.—British coal, equal in quality to the best American coal, arriving in New York harbor and offered for sale at wholesale at $4.75 a ton, has perturbed the coal barons in their souls.

The British coal comes here as ballast. The shipowners find that it is cheaper to load with coal and sell it over here than to load ordinary ballast. Each ship carrying coal ballast brings from 800 to 1,000 tons.

As American coal of similar quality is not sold at below $6 a ton, American coal men are now insisting upon a reduction in freight rates which will enable them to meet this new competition.

Washington, Dec. 29.—In announcing that a survey of the entire bituminous coal situation in the United States will be undertaken by a special staff of the National Unemployment Conference, to be appointed next week, Secretary Hoover to-day declared British coal was making inroads in the United States markets.

Mr. Hoover declared that the British now were selling coal at less than cost in anticipation of greatly increased production in English mines. More British contracts for coal, he stated, had been let in the West Indies and some British coal was making its appearance on the Pacific Coast, although mainly in the form of bunkers and was not regarded as a serious competition to United States coal there.

COL. W. E. THOMPSON, ARBITRATOR

Sydney, N. S., Dec. 28.—Col. W. E. Thompson, of Halifax has been appointed by the Department of Labor as a member of the Board of Arbitration granted the United Mine Workers of America of District No. 26 to inquire into a 33 per cent wage cut announced by some of the large coal operators of Nova Scotia for January 2. Mayor King of New Waterford is the miners' nominee.

Metal Mining in Canada

By THOS. W. GIBSON.

Canada comprises the larger part of the North American continent, its area being 3,729,665 square miles as compared with that of the United States which, including Alaska, is 3,617,673 square miles. It includes all the British territory in this part of the world excepting the island of Newfoundland, and a narrow strip of land on the adjacent coast of Labrador, which remain as a separate colony.

Geologically, a large part of Canada is of a very ancient origin, for in the great basin of Hudson Bay it is believed the first dry land appeared above the primordial seas. Whatever of mountain and valley may have characterized the original physiography of this region, glacial action has reduced the surface to a vast plain, leaving no heights more than 2,000 or 2,500 feet above the sea. Other topographic provinces are recognized in the Laurentian peneplain, the Arcadian and St. Lawrence basins, all draining into the Atlantic Ocean, the interior continental plateau, whose rivers flow into Hudson Bay and the Arctic Ocean, and the Rocky Mountain or Cordilleran ranges, which form the western flanks of Canadian America.

In so vast a region there cannot but be a great diversity of geological conditions, hence we find practically all the known geological horizons represented. The pre-Cambrian formations are the most prolific of metals, where fracturing or disturbance of the earth's crust has provided favorable conditions. In them are found the chief metal deposits of Central Canada, including the nickel and copper of Sudbury, the gold of Porcupine and Kirkland Lake, the silver of Cobalt, and the iron ranges of Michipicoten and other localities. All the metals found occur in Canada in commercial quantities, save tin, of which little more than traces have yet been recognized.

Gold.

The precious metals, especially gold, have played an influential part in the history of the human race. These metals make a strong appeal to the senses because of their beauty and their comparative scarcity and adaptability as media of exchange have contributed to make them the objects of universal desire.

Gold deposits are of two types, alluvial and lode. The stocks of gold possessed by the ancients, and, indeed, down to comparatively recent times, were derived almost solely from alluvial sources, and to this may be attributed the fact that in those parts of the earth's surface which have been longest and most fully occupied, alluvial deposits are now scarcest. The placers have been worked out. But in comparatively new countries, like the United States, Canada, Australia and Siberia, important deposits of placer gold have within late years been found and more may yet be looked for. The romance and lure of gold-diggings, where a man by his own muscles may win from the ground an immediate, and it may be a great reward, invest placer fields wherever found, with an attraction to which no other kind of mining can lay claim. From 1848, when the California diggings were located, to 1875, it is estimated that 87 per cent. of the gold produced in the world was obtained from placers. At the present time from a tenth to a fifth only comes from this source.

British Columbia and the Yukon have been the scene of the greatest gold-washings in Canada. A little gold has been won from the Gilbert and Chaudiere rivers in Quebec and from the sands of the Saskatchewan, but the central Provinces of Canada appear to possess little gold in placer form. In the case of Ontario this may seem somewhat remarkable in view of the extensive glacial erosion to which its precious metal deposits have been subjected, but beyond doubt, the immense quantities of glacial detritus have been sufficient to scatter and bury any gold or silver derived from the erosion of deposits in place. At any rate, nowhere yet has been found gold or silver in any important quantity, in the sands or gravels of Ontario.

The California discoveries in 1848 led to a tremendous influx of prospectors who found their way into British Columbia, where in 1858 and succeeding years, they located alluvial fields on the Fraser river, and in Cariboo, Quesnel, Cassiar and elsewhere. These fields yielded two to four million dollars' worth of gold annually for ten years, then declining, as do all placer and other mines, to much lower levels. Up to the end of 1920, the alluvial gold production of British Columbia is given at about $76,000,000.

The second great alluvial gold find in Canada was made on the inhospitable banks of the Klondike in 1869, and the story of the incredible hardships endured by the way and in the field, especially by the first ranks in the rush that followed, is yet fresh in the minds of the present generation. Discoveries spread to other creeks, and, in 1900, the population reached 30,000 souls, and the yield of gold $22,275,000. This was the peak year, and from that time the output decreased annually. In 1920, it had fallen to $1,500,000. The total output from the Klondike field has amounted to 8,443,774 ounces, worth $172,532,000. It is rather curious that there has been very little production in the Klondike of lode gold.

In British Columbia lode gold-mining began in 1890, with the discovery of the Rossland ore bodies, which carry both gold and copper. This was followed by the location of the large low grade copper-gold deposits of the Boundary camp. Nearly all the copper ores in British Columbia carry more or less gold. The principal gold-producing areas are Boundary-Yale and Rossland. There are also the Skeena, Coast, Lillooet and others.

In Ontario, gold was first discovered in 1866, in the vicinity of Madoc. A rich pocket was found in place, but though numerous gold-bearing veins have been located in Eastern Ontario, gold-mining has not been successfully established there. The Lake of the Woods and Seine River Districts in Northwestern Ontario, likewise contain gold occurrences spread over a large area, and several mines, notably the Sultana, Mikado, Golden Star, Regina and others, have yielded considerable bullion. These fields are not at present being actively worked.

Gold may be said to be scattered over many parts of northern and northwestern Ontario, but it was not until 1909 that gold mining in this Province was placed upon an enduring basis. In that year the first finds were made in the Porcupine field. This camp is now one of the most important on the continent and gives promise of being a still larger producer. The principal mines are Hollinger Consolidated, McIntyre-Porcupine and Dome. The Hollinger is one of the largest

gold mines in the world, its production this year will be about $9,000,000, and the yield of the entire camp upwards of $13,000,000. Kirkland Lake is another gold area which is undergoing rapid development, there are now six plants producing gold, and the output this year will be over $2,000,000.

Northern Ontario is showing itself to possess all the elements of success for the gold mining industry. It is easily accessible by rail, prospecting is by canoe and the country abounds in water-courses. There are no mountains, the climate, though cold in winter, is healthful and invigorating, and there is plenty of wood water and labor. The ores are moderately rich, running from $7.00 to $25.00 per ton but averaging say $9.00 to $10.00. The ores are free milling, the standard process of reduction being in stamp or ball mills, preferably the latter, followed by cyanidation. A significant feature is the numerous discoveries of gold and the widespread area over which they have been made. There are a number of camps not yet actually producing bullion but in various phases of the development stage; these include Matachewan, West Shining Tree, Larder Lake and others.

Nova Scotia has produced a fair amount of gold, over $20,000,000, but the yield has for a number of years been declining, and is at present very small. The gold-bearing rocks of that Province vary in width from ten to seventy-five miles, and extend some two hundred and sixty miles in length along the Atlantic coast. The deposits are in saddle-shaped quartz veins, resembling those at Bendigo in Australia. Northern Manitoba has recently been shown to contain gold, some spectacular specimens having come from there and a little bullion having been produced.

A unique feature of the gold mining industry is that it is not a competitive one, the price of gold being constant at $20.67 per ounce. When wages and supplies rise in price, the increased cost of production cannot be shouldered on the customer, as in other industries and with other metals. Hence conditions such as obtained during the war, told heavily against gold mining and brought about a stoppage of operations where the margin between expenditure and income was almost or entirely extinguished. Conversely, when labor, as now, is more efficient and wages and commodities have gone down in price, gold mining benefits by the change. In addition, gold produced in Canada, being paid for in United States' funds, the mine owners profit by the difference in exchange. In the great gold fields of the Transvaal this premium on gold is very important, and it is stated that a considerable number of mines there will be obliged to close should exchange return to normal conditions and gold again be valued at the old price of 85s. per ounce.

The declining output in gold throughout the world is occasioning some anxiety among men of finance. In 1915, the yield was $468,724,918, and in 1920, $331,987,610, a fall of nearly one-third. About two thirds of the whole comes from mines in the British Empire, the Transvaal furnishing about forty per cent. Canada is almost the only exception to the rule of declining production, her output going up year by year. Ontario is now producing more gold than any State in the Union, including California, and her yield is about twenty-five per cent. of that of the United States.

Summing up the gold production of Canada from the beginning of operations until December 31st, 1920, it appears that more than one-half the total has come from alluvial sources. This is due to the great outpouring from the Yukon creeks, but the preponderance is now shifting to lode gold, because of the increasing importance of the Ontario production. Following are the figures by provinces:

	Alluvial	Lode	Total
	$	$	$
British Columbia	75,944,000	112,753,000	188,697,000
Yukon Territory	172,532,800	.....	172,532,800
Ontario	.....	72,982,307	72,982,307
Nova Scotia	.....	20,155,000	20,155,000
Quebec (estimated)			750,000
Saskatchewan (estimated)			500,000
Total			$455,617,107

Silver.

The silver output of Canada has so far, come practically from two Provinces only—British Columbia and Ontario. In the other Provinces a little silver has been recovered in refining copper and other ores, but the amount is relatively small.

In British Columbia the chief source of silver is argentiferous galena, a large part of which is worked for lead, but considerable quantities are also recovered in treating the complex gold silver copper ores found in various parts of the Province. The silver-lead ores vary in character, in Kootenay the ore bodies are large and the silver content low; in Slocan district the ores are higher in silver, averaging perhaps seventy-five ounces per ton; in other districts are found the so called "dry" ores, containing little galena, the values being in native silver and silver sulphides.

The silver ores in Ontario, on the other hand, are worked mainly for that metal. It is true these ores contain also nickel, cobalt and arsenic, also a little copper, and these substances are recovered in the processes of treatment, but they may be regarded as incidental or by-products. There have been two eras of silver mining in Ontario; the first beginning with the finding in 1868 of very rich ore on Silver Islet, a tiny speck of land off Thunder Cape in Lake Superior, followed afterwards by discoveries on the mainland. From Silver Islet silver worth $3,250,000 was taken and from the mainland the output was valued at $1,885,681. None of these mines are now, or have for many years, been in operation, an exception being made of Silver Islet, where attempts to re-open it were under way during the present year. The second era was opened in 1903 by the finding of phenomenally rich silver deposits in what is now known as the Cobalt silver area. The veins here are narrow, mostly short and rarely deep, but to compensate for these disadvantages, they have proven to be numerous and exceptionally valuable. In the early years of Cobalt, ores carrying 6,000, 8,000 and even 10,000 ounces of silver per ton were not uncommon. 2,000-ounce ore was plentiful. Carloads of ore weighing 25 or 3 tons have been shipped out bringing to the owners a return of $100,000, $120,000 or even $130,000. The values were largely in native silver, the proportion of sulphides or galena being inconsiderable.

The geology of Cobalt was worked out at an early stage by Miller and Knight. The predominating influence in the formation of the silver deposit was a sill of diabase, intruding formations of Keewatin and conglomerate rock. The greater part of the silver production has come from veins in the conglomerate, but rich deposits have also been found in the Keewatin and diabase.

Mining at Cobalt began in 1904, and the production increased year by year until 1911, when it reached upwards of 31,000,000 ounces. Since that time there has

been a steady, though not rapid, decline, the yield in 1920 being about 11,000,000 ounces. The life of the camp has been prolonged by the high price of silver prevailing during several years of the war, and by improvements in metallurgical processes, notably the flotation method. These two factors combined to convert valueless dumps and wall rock into pay ore. Discoveries of new deposits continue to be made in old and supposedly exhausted mines. For instance, in South Lorrain, a subsidiary camp, the Keeley mine, practically given up years ago, is now producing silver at the rate of 100,000 ounces per month. Other subsidiary areas are Casey, Elk Lake and Gowganda, where the assemblage of minerals is the same. In the last named camp, the Miller-Lake O'Brien mine rivals in richness the deposits of Cobalt proper.

A feature of silver mining in Cobalt by the operating companies is its profitable character. Out of a total value produced up to 31st December, 1920, of about $200,000,000, there had been returned to the shareholders in dividends or bonuses, upwards of $82,000,000. Many of the companies paid back in dividends an amount equal to several times the original capitalization. The total silver production of Canada to 31st December, 1920, was as follows:

	Ounces	Value
British Columbia	87,017,673	54,608,653
Ontario	314,431,329	192,719,032
Quebec, Yukon and Manitoba (estimated)	6,500,000	3,965,000
Total	407,949,002	251,292,685

It may be noted that North America yields annually about 75 per cent. of the total world production of silver. While the west produces the silver, the east in large part consumes it, approximately one-half of the entire production going annually to India and China, where it largely disappears from view.

Copper.

British Columbia is the chief copper-producing Province in Canada. The most important districts are Skeena, Southern Coast, Boundary-Yale, Trail Creek. The ores are of varied composition and differ in their geological associations, but in the main are sulphides; the principal mineral being chalcopyrite, though bornite and other varieties also occur. The ores all carry more or less gold and some silver, and are treated in smelting plants in the Province. At Trail the Consolidated Mining & Smelting Company of Canada produces refined copper, lead and zinc, also gold and silver.

In the Province of Quebec large bodies of pyrite and chalcopyrite at Eustis and Capelton and other places in the Eastern Townships are operated chiefly for their sulphur contents, the ore being exported to the United States for the manufacture of sulphuric acid.

Along the north shore of Lake Huron and the east and west shores of Lake Superior in the Province of Ontario, are numerous occurrences of copper sulphides. A large deposit at Bruce Mines was opened about 75 years ago and worked with greater or less success for some time. Other deposits in the same neighborhood that have been operated are Rock Lake, Massey Station and Superior. These ores are all highly siliceous and carry from 1 to 2 or 3 per cent. of copper. The chief source of copper production in Ontario, however, is the nickel-copper ore of the Sudbury area. These mines are worked mainly for nickel, but carry from 1 to 3 per cent. of copper.

In Northern Manitoba copper sulphides of unusually high content are found in the Mandy mine, and a large body of low grade ore is contained in the Flin-flon. The latter mine is awaiting railway facilities before being operated.

The copper production of Canada to 31st December, 1920, may be given as follows:

	Quantity Lbs.	Value $
British Columbia	959,128,920	175,994,278
Ontario	469,259,209	77,534,959
Quebec, Manitoba, etc., (estimated)	....	10,000,000
Total		$263,529,237

Nickel.

In the mines of the Sudbury District, Ontario possesses the source of 85 per cent. of the world's supply of nickel. The ore is essentially a pyrrhotite mixed with chalcopyrite, and containing pentlandite as the nickel-bearing mineral. It occurs in large masses at or near the contact between norite and granite or other country rock. There has been much controversy as to the origin of these ore bodies, some geologists holding them to be the result of magmatic segregation and others of precipitation from hot solutions.

Discovery was made in 1883, during the building of the Canadian Pacific Railway. The ores were first regarded as those of copper only, and the presence of nickel was not recognized until difficulties were encountered in smelting. Jas. Riley's epoch-making discovery of the value of nickel in toughening and hardening steel led to the adoption of nickel steel armourplate for battleships, and ultimately to a large range of usefulness for nickel for industrial as well as military purposes.

There are at present three companies operating the mines, the International Nickel Company of Canada, Limited, the Mond Nickel Company, Limited, and the British America Nickel Corporation, Limited. The ores are mined and roasted, either in the open air or in sintering furnaces for expulsion of sulphur, and are afterwards smelted in blast furnaces into low grade matte. This is then bessemerized in converters into high grade matte, containing about 80 per cent. of nickel plus copper. Part of the matte is refined in Canada, part in the United States, and part in Wales. It is worthy of note that the three companies employ distinct and separate methods of refinement. The International Company use the Orford process, a combination of chemical and smelting methods; the Mond Company the process invented by Dr. Ludwig Mond, the founder of the company, based on the affinity of carbon monoxide for finely divided nickel, and the British America Corporation, the Hybinette or electrolytic method.

Ore similar to that of Sudbury is found at the Alexo mine in the Porcupine area, and nickel is a component of silver ores of the Cobalt camp. The quantities obtained from these sources are small in comparison with those from the mines at Sudbury. Reserves of ore at the latter place are estimated at 150,000,000 tons.

During the war the demand for nickel and copper was insatiable, and the signing of the Armistice found large stocks of both in the hands of the Allied Governments, their contractors and the mining companies. The slow process of reconstruction has not as yet permitted the absorption of these stocks. In consequence, the Sudbury mines and smelters are idle, or nearly so.

and production for the time being has almost ceased The usefulness of nickel for niekel-steel, coinage, electro-plating, Monel metal and other alloys, and other industrial purposes, which before the war employed at least 50 per cent. of the output, will when manufacturing has again attained its normal proportions, assure this metal coming into its own.

Lead.

Most of the lead produced in Canada has come from the argentiferous galena ores of British Columbia, many of which carry also zinc. Active operations in that Province began in the Ainsworth camp in 1886, and discoveries in 1892 in the Sandon camp and East Kootenay extended the industry to these localities. The Fort Steele and Slocan districts are at present the largest producers.

An ore body remarkable for its size and quality, containing lead and zinc, is now being worked in the Sullivan mine, north of Cranbrook Station on the Canadian Pacific Railway. The ore is shipped without concentration to the smelter of the Consolidated Mining & Smelting Company at Trail, where a very successful method of selective flotation and subsequent electrolytic refinement, has been worked out by that company.

In Ontario galena ores carrying little or no silver have been worked on a small scale at the Frontenac and other properties in Eastern Ontario. Smelting works were erected over forty years ago, but operations have been sporadic and on a small scale. In recent years a small mine and smelter have been successfully worked at Galetta near Ottawa.

The output of lead in Canada up to 31st December, 1920, was as follows:

	Quantity, lbs.	Value, $
British Columbia	1,040,486,931	50,179,202
Ontario	8,772,000	786,600
Total	1,049,258,937	50,967,802

Zinc.

British Columbia produces practically all the zinc mined in Canada. There are lead-zinc deposits in Ontario and Quebec but their size and production are insignificant in comparison with those of the Pacific Coast, where in general, the ores are closely associated with lead. A successful solution of the metallurgical problem long presented in the separation of zinc from lead, has given both these branches of mining a distinct impetus. The production and marketing of zinc as a separate metal is practically confined to the last few years.

The output of zinc, up to the end of 1920, from British Columbian deposits was 22,734,207 lbs., valued at $18,600,000, plus a small production from Quebec and Ontario.

Iron.

There is an important iron smelting industry in Canada, but it is almost wholly dependent for its supplies of ore on outside sources. At Sydney, Cape Breton extensive plants for the manufacture of pig iron and steel have been erected in proximity to the coal beds that are located there. The iron ore charged into the furnaces comes from Bell island, Newfoundland, perhaps one of the largest and best deposits of iron ore known.

In Quebec a small charcoal iron industry for many years made use of the bog ores found in that Province. Ontario produces most of the pig iron made in Canada but makes 95 per cent. of it from ore imported from the United States. From Port Arthur to the Pacific Coast no iron ore is smelted.

This condition is not due to lack of iron ore deposits, for such exist in nearly every Province. Two chief causes may be assigned for the slow development of an iron mining industry in Canada; first, the quality of our deposits, many of them being low in grade, and secondly, the ease with which ironmasters can supply their wants from long-established sources elsewhere. With regard to the first cause, the Province of Ontario has numerous and extensive iron ranges in the north and northwest, containing on the aggregate, millions, perhaps billions of tons of ore. For the most part, the ores are too siliceous for present use. They contain from 30 to 40 or 45 per cent. metallic iron, and in their natural condition cannot compete with the excellent ore which can be obtained of almost any desired composition from the mines of Michigan and Minnesota, delivered, too, by water carriage.

The iron ranges of Ontario are mostly of magnetite or a mixture of magnetite and hematite, but there are also siliceous hematites and much siderite. Various forms of beneficiation are used to render these ores suitable for present furnace practice, and this, of course, adds to the expense. May it not be that inventors should turn their attention to the other side of the problem and endeavor to adapt a process to the ores, rather than the ores to the process?

Iron deposits of good quality, however, do exist, and have been worked in Canada. Eastern Ontario contains a number of such, from which considerable shipments have been made. Here, sulphur and titanium are the objectionable ingredients rather than excess of silica. At the Helen mine in Michipicoten, some three million tons of good ore were extracted. This ore body resulted from the alteration of siderite, and it is believed other deposits of like character exist in that region. At the Magpie mine the siderite when roasted, makes first class blast furnace material, and so does the magnetite at Moose Mountain when concentrated and briquetted.

Iron ores are found in Nova Scotia, New Brunswick, Quebec, Ontario and British Columbia. The prairie provinces contain hematite, limonite and clay iron stone, but so far have furnished no production of iron.

Minor Metals.

The silver ores of the Cobalt camp contain cobalt which is recovered as cobalt oxide in the refineries. Before the war a large trade was carried on in this article with England and the continent of Europe where it is extensively used in the manufacture of china and porcelain. Metallic cobalt is also made and is used in making an alloy called stellite which has been found very useful for high speed tools.

There are deposits of chromium in Quebec and some production took place during the war, but the development has not as yet been extensive.

The nickel copper ores of Sudbury carry appreciable quantities of platinum, osmiridium, and other metals of the platinum group. The platinum occurs as the arsenide sperrylite but the palladium mineral has not been isolated. A proportion of these metals is recovered in refining the matte, the production in 1920 being 8,400 ounces of platinum and 10,000 ounces of palladium.

Northern Ontario Letter

THE SILVER MINES.

Prices and Wages.

As time wears on and with the price of silver remaining quite steady at around 65 cents an ounce, the feeling is taking form that this may mark the approximate average price for some time to come. Calculated upon a basis of current consumption, inclusive of the purchases being made by the United States Treasury, the visible supply of the metal would encourage the belief that the demand might soon become greater than the supply and thereby cause quotations to rise. As to this, however, with certain of the leading nations in a state approaching impoverishment in a monetary sense, it at once becomes obvious that a barrier exists to any general demand for commodities other than real necessities.

With these views in mind, the operators of silver mines in the Cobalt district are found estimating the value of the mines on silver at from 60 to 65 cents per ounce. The avenue to profitable operation of certain of the mines which as yet remain closed lies along the gradual decline in the cost of supplies and probably another substantial reduction in wages.

Installing Plant at Haileybury Frontier.

The Mining Corporation of Canada has completed arrangements to instal a larger mining plant on the Haileybury Frontier property in South Lorrain. Towards this end, the electrically-driven hoist as well as compressor from the old Cobalt Lake plant is being removed at once to the Frontier. The plan of operation consists of further work at the point where former development work has been going on as well as diresting considerable attention to an endeavor to pick up the continuation of the "Woods" vein which is believed to extend onto the Frontier from the Keeley Silver Mines. Work on the Frontier up to the present amounts to less than 1,000 feet of underground work, as a reward for which a number of small ore shoots have been found. Work on a wide scope such as that planned by the Mining Corporation holds out promise of interesting results.

Victory Silver Mine.

In a report made by J. A. McVichie, the geological structure on the property of the Victory Silver Mines is shown to be very favorable. Reasons are given why the keewatin formation overlying the diabase became fractured, how the shearing occurred and all of which created a condition which would permit the silver bearing solutions from the intruding diabase to pass through and leave the precious metal in the fractures, thereby forming veins. Recent work at a depth of 185 feet has resulted in the discovery of a wide vein on which lateral work is now in progress and in which the prospects appear to be good for finding ore in substantial quantities.

Nipissing Explorations.

The Nipissing Mining Company recently examined property in the Sault Ste Marie district, but found nothing of particular interest. In the meantime a great deal of staking has been done in the district on the strength of the reports that the Nipissing had become interested.

On the other hand, the Nipissing is meeting with considerable encouragement in the work of exploring the Rochester property in the Porcupine district. Six holes have been drilled by diamond drills and a seventh is now down about 300 feet. In holes No. 2 and 5 the ore showed commercial values across good stoping width and the seventh hole, which will be driven to a depth of between 500 and 600 feet, is for the purpose of proving the continuity of the zone of mineralization. The formation has been found to consist of basalt, red porphyry and quartz porphyry, thereby resembling the adjoining Hollinger Consolidated. The Nipissing's option is for $250,000 and holds good until early spring, provided a certain amount of work is performed monthly.

Hudson Bay.

No announcement has so far been made in regard to whether the Hudson Bay will interest itself in the Cane Silver Mines, or not.

Coniagas.

The Coniagas has been mentioned as being identified with negotiations for an option on the old Ruby property, situated in the township of Bucke.

Trethewey.

Further reports are current in connection with the Trethewey Company, in connection with the plans of the company to secure funds with which to operate the Castle property in Gowganda as well as instal a small mill. It is intimated that a new company may be incorporated, either that or an increase made in the capitalization of the present company. In the meantime, stock traders have appeared to register their disapproval of the scheme, and the quotations for the shares declined to around five cents each during the closing days of December.

A number of small properties are deriving the benefit of sleigh transportation and considerable exploration work is being done in certain sections of the Gowganda field. The continued high wages, however, without compensation in the way of high quotations for silver, has militated against any general expansion in activity.

THE GOLD MINES.

McIntyre.

Work in connection with putting the property in shape for greatly increasing its production in the spring is proceeding at a rapid rate on the McIntyre-Porcupine. The mill continues to treat about 550 tons of ore daily and is producing at the rate of between $5,000 and $6,000 daily. The new milling unit now being installed for the purpose of treating the high-grade carbonaceous ore found in one section of the mine will have a capacity for handling 250 tons daily and will be ready for operation in the early spring, thereby increasing tonnage to 800 tons daily and resulting in a production of at least $8,000 every twenty-four hours. This means that the McIntyre will then be able to produce approximately $250,000 every thirty days, or at the rate of around $3,000,000 a year. A conservative estimate of net profits, based upon achievements already recorded, may be placed at $100,000 monthly, or well over 30 per cent a year on the company's issued capital of $3,600,000.

Moneta and Inspiration.

The good results of the Rochester property, which are referred to in greater detail under "The Silver Mines" in a preceding paragraph of this letter, are such as to encourage hope on such properties as the Moneta and Inspiration, both of which also lie in such a position as to likely share at least a part of the geo-

logical condition under which the Hollinger finds its ore.

Hayden.

Operations are actually under way on the Hayden-Porcupine after an idle period of several years. This is only one of the many signs of a general revival in gold mining activity, even among the properties in the prospective and development stage.

Triplex.

Reports that the Triplex had purchased a second-hand 20-stamp mill was premature, as such a plan has not yet passed beyond the point of negotiations. In the meantime, work is being carried on steadily.

Dome.

Continued heavy production from the Dome Mines is pointed to in well informed circles as assuring a realization of at least $1.00 per share as capital return not later than the end of March. This "disbursement" when made will be in addition to current dividends of 10 per cent annually and will not be subject to taxation. The report printed in certain sections of the press that selenium had been found in some of the ore on the Dome is not of any special significance. The only feature in connection with the presence of this material is that it causes a slight problem in connection with getting a high percentage of gold recovery. By reason of some undetermined agency, possibly selenium, the gold content of the tailings is found to fluctuate, but not to any alarming extent.

Davidson.

The curtailment of operations on the Davidson mine are stated to be temporary, and it is believed general operations will resume in the spring. Diamond drilling from surface will be carried on during the present winter on a section of the property heretofore unexplored.

Lake Shore.

During the month of November the Lake Shore Mines established new records, in spite of the mill having operated only 92.36 per cent of the possible running time.

A total of 1,810 tons of ore went through the mill, from which an average of $30.02 was recovered from each ton, or a total of $54,343.51 for the month. Therefore, in point of average values as well as total output, the November achievement was the best so far in the history of the mine.

A feature of work during the month was the exceptionally favorable results at the 600-ft. level where the ore deposition in vein No. 2 has been found to be even greater than found at the 400-ft. level. Assays of $50 and $100 per ton are not uncommon in certain sections of the vein over a length of 600 feet.

As work proceeds, the Lake Shore is looming up as a much larger mine than has generally been supposed.

Bidgood.

The vein on the Bidgood property where cut at the 400-ft level has been found to have a width of over 20 feet, although values are comparatively low. Lateral work will be carried on for the purpose of proving the downward continuation of ore found at the preceding level.

Shareholders of the Teck-Hughes Gold Mines availed themselves to a large extent of the opportunity to subscribe for newly issued stock in the company. At the time of writing, the full amount subscribed for has not been announced, but it is understood that whatever balance is left of the 1,722,000 shares will be taken up by the bondholders. The indications are that the indebtedness of the company will be reduced from $635,000 to about $312,000.

British Columbia Letter

Stewart, B.C.—Heavy snowfalls have stopped almost all mining activity in the Portland Canal District. Work continues, of course, on the Premier Mine and such other properties as are well advanced in development and have made preparations for winter operations. On Fish Creek, for instance, the Fish Creek Mining Company has a gang of men busy. A crosscut tunnel on the upper lead is said to have shown the vein to be 11 feet in width and within its compass are three distinct shoots of high grade ore. The vein filling all is reported to be good milling material. A winze now is being sunk on the vein. The high grade is being sacked as it is broken down and will be shipped over the snow. The aerial tramway to the Silverado Group has been completed and a considerable quantity of high grade ore is to be sacked and shipped.

Esperanza.

Alice Arm—The Esperanza Mine, which lies at an elevation of about 800 feet about one mile north of the town of Alice Arm, will ship approximately 100 tons of ore in the course of a few weeks. D. Jeremierson of Vancouver, and associates, are the present owners of the property and it is their intention, providing the first shipment is a success, to continue the work during the winter.

Utica Mine.

Kaslo, B.C.—O. C. Thompson, who is in charge of development work on the Utica Mine, states that much has been done in opening up and generally putting in shape for operation purposes the old workings of the property. New ore has been blocked out in different places and a car has been loaded ready for shipment. Mr. Thompson expects to be on a regular shipping basis soon.

Shipments to Trail.

Trail, B.C.—Shipments to the Trail Smelter of the Canadian Consolidated Mining & Smelting Co. for the week ending December 21 were 5,756 tons, distinctly under the average of the past few weeks. The Josie of Rossland, was the only independent shipper being credited with 102 tons.

The Britannia Flood.

Vancouver, B.C.—The charges laid against Messrs. E. J. Donoghue and C. P. Brownlee, officials of the Britannia Mining Company, of criminal negligence in connection with the flood catastrophe that practically destroyed the mining community of Britannia with much loss of life, have been dismissed. The magistrate observed that the Crown had not presented evidence to show who was in control at the time of the disaster and there was nothing to indicate that anyone had thought there was any danger. The water only rose before it had come to the top of the culvert, the warping of which was alleged to have caused the flood. This did not seem to have been any lack of precaution. The company had exercised its best judgment and the only thing that could be charged was an error of judgment.

Engineers Will Lecture.

Victoria, B.C.—The resident mining engineers in charge of the six mineral survey districts into which the Provincial Government has divided the Province have received instructions to deliver a series of lectures to mine operators and prospectors in the several centres of their respective zones of responsibility. This policy was inaugurated last winter and the addresses were much appreciated. These talks by the engineers do not pretend to exhaustively cover the technical phases of mineralogy, geology, or chemistry. The consist more of practical pointers to those interested as prospectors or in other respects in the mining business. They also give interesting information on the minerals of the Province.

THE BETTY COAL SEAM.

A Primising Coal Seam on Telkwa River, British Columbia.

In a report of the Aveling Coal Property, situated on Telkwa River, Northern British Columbia, John D. Galloway, provincial resident mining engineer, refers optimistically of the possibilities of this practically undeveloped coal field.

He says. "The main coal showing on the property, known as the *Betty* seam outcrops along the edge of the Telkwa river. Two tunnels, the longest being over 100 feet have been driven into the seam. The seam is a large one, as the thickness is at least 20 feet; of this 20 feet over 18 feet is coal and a good deal of this is an excellent quality of coal. At the present time a band of coal 2 feet thick is left on the roof as it makes a better roof than the soft friable shales. Below this top coal is a band of 18 inches of coal that is being sold as blacksmith coal: an average analysis of this is:—Moisture, 1.8 per cent.; V.C.M. 31.0 per cent.; Fixed Carbon, 63.6; Ash, 3.6.

At the present time two main bands of coal are being worked, the top one being 6 feet thick and the bottom one 4 feet. There is coal above and below these bands and they are separated by about 4 feet of coal in which there are some shale bands.

As has been previously said the coal is of good quality; this is well illustrated by the following analysis which is a calculated average of six average samples taken across different bands of coal in the mine:—Moisture, 2.1; V.C.M., 26.1; Fixed carbon, 66.8; Ash, 5.0. By applying Dowling's Split Volatile Ratio to this analysis the coal would be classed as a bituminous coal but lies very close to the classification of high-carbon bituminous. The moisture content of these analyses is probably higher than will be found in the coal when at some distance from the surface. One noteworthy feature of this coal is the low ash content, which is considerably lower than most coals now being sold in British Columbia. It is apparent that this coal will make excellent steam coal and should also prove to be a very suitable domestic fuel. Coking tests have not as yet been made on the coal.

The Betty coal seam has not as yet been traced for any great distance on the surface, nor has any drilling or other deep development been done. According to Leach's geologic map covering this area there is at this point an exposure of 3 to 4 square miles of coal formation and if this Betty seam is continuous throughout this formation it is apparent that there is in the field a large tonnage of coal.

The opening up of this coal property would be greatly expedited by diamond drilling and, if the results were satisfactory, the building of a branch railway from Telkwa. No such plans are however being considered. The leasers intend to mine coal and ship by wagon, sleigh, or tractor haulage, and to gradually develop the mine by advancing the tunnels. A good market for this coal is available at Prince Rupert. The cost of hauling over a poor road for seven miles leaves but little margin for mining the coal. However, it is expected that with good sleighing conditions this winter that steady shipments will be made. As the lease held by Gillespie & Wilson can be terminated at any time on thirty days notice in the event of the property being sold, there is not much inducement to them to make any heavy capital investment in road or other improvements.

The quality of this coal and the price that Gillespie & Wilson quote for it laid down f.o.b. the railway cars at Telkwa is such that this coal can compete very successfully with Vancouver Island or Alberta coal. As yet, of course, the amount sent to Prince Rupert has been insignificant but still the coal dealers of that city are very anxious to secure a steady supply of it. It is apparent that if this coal can be mined and hauled over seven miles of indifferent wagon-rodd and sold at a profit that there are great possibilities for the property if opened up and equipped for large scale mining and provided with railway transportation. In addition a plentiful supply of good coal at a reasonable price would have a stimulating effect on all Northern British Columbia.

The tonnage shipped from this mine for 1921 is estimated at 865 tons.

MINING INSTITUTE ANNUAL MEETING.

The Twenty-fourth Annual General Meeting of the Institute will be held in Ottawa on March 1st, 2nd and 3rd. It will be recalled that the last Annual Meeting had been scheduled to take place in Ottawa, but, owing to an epidemic of small-pox in that city, it was deemed advisable to transfer the meeting to Montreal. Several important papers have already been promised for the forthcoming meeting, and these will be printed in the January and February Bulletins. Members who propose to contribute papers are reminded that, in order to ensure publication prior to the meeting, as is desirable, manuscript must reach headquarters in Montreal not later than January 10th.—Institute Bulletin.

LABRADOR.

Professor A. Coleman, of the University of Toronto, gave a graphic description of the north-eastern corner of the continent when speaking on the subject, "Frigid Labrador," before the members of the Geological and Geographical Section of the American Association for the Advancement of Science at a session yesterday in the Mining Building, Queen's Park. The title of his address was "The Geology and Surface Features of the Torngat Mountains in Northern Labrador."

North-eastern Labrador, he said, was a treeless region and had been carved by rivers and glaciers into the wildest mountains of Eastern America. Its climate, with less than two months of summer, is the most rigorous to be found on the mainland of North America, and its small population of Eskimos is confined to the shore, depending on the swarming life of the sea.

In the area visited there is very little cover on the rocks. There are no trees and very little soil. Archean rocks are exposed over large areas and the formation can be examined under exceptionally favorable circumstances. There are very few people in the district and there is little known concerning the mineral resources.

Underground Loading Devices in Metal Mines

By C. LORIMER COLBORN, (Mining Engineer, U.S. Bureau of Mines).

(Continued from last week)

The machine has been in operation in the mines of the National Lead Company, St. Francois, Missouri. The record for the month of February, 1921, was an average of 96 tons of ore loaded in an eight-hour shift with one operator and one helper; 3,360 tons was loaded during the month. These two men not only load the cars but push the empty one-ton capacity cars to the machine and deliver the loaded cars to the motor haulage loop.

A labor cost of 9½c. per ton was reported for the February operation. To this should be added the cost of power and repairs. The management expects to reduce their present loading costs of 16.64c. per ton by using this machine.

The Conway shovel loader consists of a boom mounted on the forward end of a steel frame. An electric motor and the necessary mechanical parts are also mounted on the steel frame, which is on a truck and can travel anywhere on the regular mine track. A dipper slides back and forth on the boom. The boom can be swung to either side or up and down.

The machine is controlled by an operator who stands to the right of the machine. The movement of the dipper and boom is controlled by two levers. The dipper is pulled into the pile of material and after filling itself is raised over the car, placed on the track to either side of the machine. As soon as the dipper is over the car, the door in the bottom is tripped by the operator pulling a rope.

During 1920, at the St. Louis Smelting and Refining Works of the National Lead Company, St. Francois, Mo., 169,351 tons of ore was loaded by seven of these machines, which made an average of 62.4 tons loaded per shift, at a cost of 16.64 cents per ton. The costs were distributed as follows: Operating labor 14.9 cents, repair labor 0.30 cents, supplies 0.92 cents, power 0.41 cents, total 16.64 cents per ton.

The Shuveloder is a shoveling machine operated by compressed air, which drives the dipper into a pile of loose material, lifts the loaded dipper and empties it into the car which is brought up immediately behind the machine. The dipper, together with the four air cylinders that operate it and the mechanical parts that impart motion to the dipper, make up what is known as the main body of the machine. All these are mounted on a truck which can be moved on the ordinary mine track. The machine is hand-propelled. Immediately above the truck and beneath the main body is a turntable which provides lateral movement. The Shuveloder is the latest model of what was formerly known as the Armstrong Loader. Its overall length is 6 ft.; overall width 4 ft.; overall height 4 ft. The weight is approximately 4,300 lb. The dipper is 30 in. in width, and the head room required for operation is 6 ft. 10 in. The manufacturers state that it takes from 150 to 175 cu. ft. of free air per minute at 80 lb. pressure to operate the machine. It will load material in any car of a height 50 in. or less above the top of the rail.

The machine is controlled by three levers on the right-hand side of the machine. The operator stands on the ground. The Shuveloder is not of continuous operation type but each motion has a separate control which is reversible. The mechanism is driven by three series of cylinders. The air is admitted successively into the bottom cylinder, two centre cylinders, and then the top cylinder. The bottom cylinder gives motion to the body pushing it forward, crowding the dipper into the pile of loose rock. The two centre cylinders turn the two rope sheaves which raise the dipper up through the pile. The top cylinder then pulls the crosshead back, causing the dipper to swing over the top of the machine and to discharge the material into the car in the rear. Simultaneously with the operation of the upper cylinder, the bottom cylinder receives air, which causes it to pull the body piece back to the starting position. The air is admitted to the rear end of the other cylinders in their turn which brings them all back to the starting position. There is no movement to the truck, which is clamped to the track. The lateral movement to the machine which is provided on the turntable is obtained by a ratchet worked by hand. The machine has a reach of 5½ feet to either side of the centre of the track, and always discharges into the centre of the car behind, from any lateral position of the body piece.

One man is required to operate the machine and one man can switch the cars. In some places where digging is quite difficult, a third man is used as a helper. At one mine the loader was used intermittently. Working on rock it shoveled 72½ cars of 2-4-5 tons capacity in 35½ hours, at a cost of 25.09c. per ton. This included tramming the cars 370 feet. The actual time of loading was 16¼ hours. The delays were due to tramming, switching, loader off track, and repairs. In another test, working on soft iron ore, 208 cars were loaded in 139¼ hours at a loading cost of 12.97c. per ton. The actual loading time was 21½ hours.

An Armstrong No. 11 shovel was in use at the Colby mine of the McKinney Steel Company, Bessemer, Mich., to load broken rock in driving drifts. The drifts are 7 ft. high by 8 ft. wide, and the pile of rock is about 19 ft. long and about 4 ft. high at its deepest place. There were about fourteen carloads of 32 cu. ft. capacity to the pile. Two men were used in loading; one operator and one attendant who switched the cars. The machine was observed during the shoveling of one of these piles of material with the following results:

Total time of setting up machine, 10 minutes; time of loading fourteen cars, 58 minutes; 12 move ups of loader, 30 minutes; switching twelve cars, 92 minutes. Total, 190 minutes. Total number of cars loaded, 14; total cubic feet, 448; total number of move ups, 12; total number loader dippers, 232. Average number of loader dippers to cars, 16; average number of loader passes per minute, 4; average time for loading cars, including move ups, 6 minutes; average time for loading one ton of rock, including move ups, 2.4 minutes. Total time required for setting up the Armstrong shovel, loading and tramming of the rock, broken from an average break of a round of holes took one hour and 45 minutes.

(To be continued)

MINING IN ALBERTA.

A novel method of mining coal was described by Mr. James McEvoy at the Toronto meeting of American Association for the Advancement of Science. Concerning this method Mr. Long said: "The beds or seams of coal in the district near Edmonton do not lie flat, but are inclined rather steeply, and advantage of that fact has been taken in the mining. From the hoisting shaft a tunnel is run along the under-side or floor of the bed practically on a level. From this main tunnel, narrow angles or drifts are run through the coal along the floor up the inclined bed to a point where mining is to commence. At intervals of 40 to 50 feet along these main angles, back angles are driven from the sides in such a way that the coal when loosened will move toward the main angles. These back angles may be carried some distance from the main angles and along these at the same intervals of distance crosscuts are driven. So that the whole area to be mined is divided into blocks of coal 40 to 50 feet square.

"The mining or drawing of the coal commences at the highest or top row of the blocks or pillars. A few shots placed at the foot of one of these pillars loosens the coal and it starts running down throught the angles and chutes to the main tunnel where it is loaded in cars placed under the chutes, and taken to the shaft to be hoisted. Each pillar is taken in turn until the row is finished then the next row of pillars is similarly treated."

U. S. BITUMINOUS PRODUCTION.

Production of bituminous coal during the first 302 days of the past five years, the period over which records of weekly output extend, has been as follows:—

Years of Activity.	
1917	542,191,000
1918	569-178,000
1918	569,178,000
1920	543,049,000
Years of Depression.	
1919	446,951,000
1921	401,051,000

It will be seen that from the viewpoint of soft-coal production, 1921 is behind all recent years. The output to date is 46,000,000 tons less than in 1919, also a year of business depression and one in which the situation was made worse by the occurrence of the great strike. As indicated by incomplete reports for the final week of the year, the total output for 1921 will be about 408,000,000 tons.

IRON ORE.

The iron ore mined in the United States in 1921, exclusive of that which contained more than 5.5 per cent of manganese, is estimated at 29,547,000 gross tons, a decrease of 56 per cent as compared with the output in 1920. The shipments of ore from the mines in 1921 are estimated at 27,009,000 gross tons, valued at $89,688,000, a decrease in quantity of 61 per cent and in value of nearly 69 per cent as compared with the shipments of 1920. The average value of the ore per gross ton at the mines for the whole of the United States in 1921 is estimated at $3.32; in 1920 it was $4.11. The stocks of iron ore at the mines, mainly in the Michigan and Minnesota, apparently increased from 11,378,794 gross tons in 1920 to 13,872,000 tons in 1921, or 22 per cent. The output of iron ore in 1921 was the lowest since 1904, when 27,644,330 tons was mined.

U. S. ANTHRACITE PRODUCTION.

The anthracite industry has at length felt the combination of industrial depression and the warm autumn, and production is steadily declining. As against an average of 35,000 or 36,000 cars in recent full-time weeks, the nine anthracite carriers reported loading 30,813 cars in the week ended December 17 (Table III). On this basis it is estimated that the total production including mine fuel, local sales, and the product of dredge and washery operations, was 1,611,000 net tons, a decrease of 5 per cent, from the preceding week, and of 16 per cent when compared with the week ended November 19. A year ago a production of 1,998,000 net tons was reported.

ZINC PRICES IN 1921.

Early in January zinc concentrates containing 60 per cent of zinc were selling in the Joplin district at $28 a ton, having dropped from $60 a ton at the beginning of 1920. The price dropped to $21 by the beginning of March, rose to $26 by the begining of May, dropped to $21 by the middle of June and remained at that point until late in August, when it reached bottom at $20 a ton. Through the last quarter of the year there was considerable improvement in price and at the end of the year concentrates were selling at $28 to $30 a ton.

LEAD AND ZINC IN 1921.

The mine and smelter output of lead in the United States in 1921 each fell off abont 20 per cent and the mine and smelter output of zinc declined nearly 60 per cent, according to a statement by C. E. Siebenthal and A. Stoll, of the United States Geological Survey, Department of the Interior, compiled from reports and estimates by producers and others.

DOME MINES.

New York, Dec. 29.—Dome Mines treated abont 30,000 tons of ore in November. Mill heads averaged $8.40 a ton, operating costs were about $3.50 a ton. This resulted in a profit of about $145,000, or three times dividend requirements at the current rate. One of the interesting things about Canadian mining companies is that they are among the corporations in Canada which are aided by the depreciation of Canadian exchange in terms of dollars.

J. A. CAMPBELL ACTS AS COMMISSIONER.

Winnipeg, Dec. 29.—J. A. Campbell, former Member for Nelson, has been appointed acting Commissioner of Northern Manitoba for a period of one year, it was announced here to-day. Mr. Campbell has been acting Commissioner since Prof. R. C. Wallace retired from the post four months ago.

HIGH GRADE AT LA ROSE.

Cobalt, Dec. 27.—In opening up a new section of the stope from the 90 foot level of the University, La Rose last week, broke into the best ore located on the property, states the Northern Miner. It is about four inches wide, very high grade ore. It is yet too early to say whether this is merely a patch or something of size.

The winz being sunk from the 530 foot level of the Violet should be down to the 600 by January 1st. Forty or fifty feet of crosscutting will have to be done before the vein is reached. On the 530 foot level this vein has an ore shoot 225 feet long, with ore still in one face.

Caveins have given old La Rose property some trouble, but the damage has been exaggerated.

The Canadian Miners' Buying Directory.

Acetylene Gas:
Canada Carbide Company, Ltd
Prest-O-Lite Co. of Canada, Ltd

Acetylene Welding:
The Toronto Iron Works, Ltd.

A.C. Units:
Powley & Townsley, Limited.

Agitators:
The Dorr Co.
Can. Chicago Bridge & Iron Co., Ltd.
Horton Steel Works, Limited.

Air Compressors:
Bellliss & Morcom, Ltd.
Laurie & Lamb

Air Hoists:
Canadian Ingersoll-Rand Co., Ltd
Mussens, Limited.

Air Receivers:
The Toronto Iron Works, Ltd.

Alloy and Carbon Tool Steel:
Peacock Brothers Limited.

Alternators:
MacGovern & Co

Aluminium:
Spielman Agencies, Regd.

Amalgamators:
Northern Canada Supply Co
Mine and Smelter Supply Co
Wabi Iron Works.

Antimony:
Canada Metal Co.

Antimonial Lead:
Pennsylvania Smelting Co

Assayers' and Chemists' Supplies:
Dominion Engineering & Inspection Co.
Lymans, Limited
Mine & Smelter Supply Co
Pennsylvania Smelting Co.
Stanley, W. F. & Co., Ltd

Ash Conveyors:
Canadian Link-Belt Company

Ashes Handling Machinery:
Canadian Link-Belt Co., Ltd

Assayers and Chemists:
Milton L. Hersey Co., Ltd
Campbell & Deyell
Ledoux & Co.
Thos. Heys & Son
C. L. Constant Co.

Asbestos:
Everitt & Co

Balls:
Hull Iron & Steel Foundries, Ltd
Peacock Brothers Limited
The Wabi Iron Works.
The Hardinge Conical Mill Co
The William Kennedy & Sons, Ltd.

Ball Mills:
Hardinge Conical Mill Co
Hull Iron & Steel Foundries, Ltd
The Wabi Iron Works
The William Kennedy & Sons, Ltd

Babbit Metals:
Canada Metal Co
Hoyt Metal Co.

Ball Mill Feeders:
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd

Ball Mill Linings:
Hardinge Conical Mill Co
The William Kennedy & Sons, Ltd
Peacock Brothers, Limited
Hull Iron & Steel Foundries, Ltd

Belting—Leather, Rubber and Cotton:
Canadian Link-Belt Co., Ltd
The Mine & Smelter Supply Co
Northern Canada Supply Co
Jones & Glassco.

Belting:
R. T. Gilman & Co
Gutta Percha & Rubber, Ltd

Belting—Silent Chain:
Canadian Link-Belt Co., Ltd
Hans Renold of Canada, Limited Montreal.
Jones & Glassco (Regd.)

Belting (Transmission):
Goodyear Tire & Rubber Co

Belting (Elevator):
Goodyear Tire & Rubber Co

Belting (Conveyor):
Goodyear Tire & Rubber Co
Gutta Percha & Rubber, Ltd

Bins and Hoppers:
The Toronto Iron Works, Ltd.
Can. Chicago Bridge & Iron Co., Ltd.
Horton Steel Works, Limited.

Blasting Batteries and Supplies:
Canadian Ingersoll-Rand Co., Ltd
Mussens, Ltd.
Canadian Explosives, Ltd.
Powley & Townsley, Limited.

Bluestone:
The Consolidated Mining & Smelting Co
The Coniagas Reduction Co., Ltd.

Blowers:
Canadian Fairbanks-Morse Co., Ltd
Northern Canada Supply Co.

Boilers:
Canadian Ingersoll-Rand Co., Ltd.
Marsh Engineering Works
R. T. Gilman & Co.
The John Inglis Company
Wabi Iron Works.

Blue Vitriol (Coniagas Red):
Canadian Fairbanks-Morse Co., Ltd.

Bortz and Carbons:
Diamond Drill Carbon Co.

Boxes, Cable Junction:
Standard Underground Cable Co. of Canada, Ltd.
Northern Electric Co., Ltd.

Brazilian Rough Diamonds:
Diamond Drill Carbon Co.

Brazilian Mica:
Diamond Drill Carbon Co.

Buggies, Mine Car (Steel)
Hendrick Manufacturing Co

Brazilian Ballas:
Diamond Drill Carbon Co.

Brazilian Rock Crystal:
Diamond Drill Carbon Co.

Brazilian Tourmalines:
Diamond Drill Carbon Co

Brazilian Aquamarines:
Diamond Drill Carbon Co.

Bridges—Man Trolley and Rope Operated—Material Handling:
Canadian Mead-Morrison Co., Limited

Bronze, Manganese, Perforated and Plain:
Hendrick Manufacturing Co.

Buckets:
Canadian Ingersoll-Rand Co., Ltd
R. T. Gilman & Co.
Hendrick Manufacturing Co.
Canadian Link-Belt Co., Ltd
Marsh Engineering Works
Mussens, Ltd.
MacKinnon Steel Co., Ltd.
Northern Canada Supply Co.
The Wabi Iron Works

Buckets, Elevator:
Canadian Link-Belt Co., Ltd
Hendrick Mfg. Co.
Peacock Brothers Limited.

Cable—Aerial and Underground:
Canada Wire & Cable Co.
Northern Canada Supply Co
Standard Underground Cable Co. of Canada, Ltd
Peacock Brothers, Limited

Cableways:
Canadian Mead-Morrison Co., Limited
Fraser & Chalmers of Canada, Ltd
Mussens, Ltd.
The Wabi Iron Works
R. T. Gilman & Co.

Cages:
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que
Northern Canada Supply Co.
Fraser & Chalmers of Canada, Ltd
The Electric Steel & Metals Co
The Mine & Smelter Supply Co
Mussens, Ltd.
The Wabi Iron Works

WAGE REDUCTIONS FOR GOLD MINES.

The "Northern Miner", published at Cobalt, says:

Wage reductions are coming in the gold camps. Regardless of opinions held to the contrary, the Porcupine will bring this capital in, and mines now closed will mines will have to cut wages. Northern Ontario gold camps are probably the highest wage mining camps in America today, and the Ontario mining industry cannot stand it forever.

"High wages are a cause of unemployment. Those who have jobs will be hit by a reduction, but the many whohaven't jobs are going to be greatly benefited. Considerable needed capital is delaying investment in gold mining because of the high cost. A cut in wages open, and undeveloped properties will be worked. A wage cut at Porcupine will create jobs. Hundreds of thousands of tons of rock now classed as waste will be metamorphosed into ore when the cost of recovering the gold contents is cut. Moreover a reduction is becoming inevitable. Shareholders will force the hands of managers, especially of those mines that have a low average grade of ore. Another factor is the decline in the exchange premium; it is to-day one-third what it was a year ago, 6½ per cent. against 19 per cent.

"So many influences are working for lower wages in the gold camps; the desire of the mines to treat a lower average grade of ore, the fact that new capital wants lower costs before embarking on employment-giving mining enterprises the decline in exchange premium, that The Northern Miner is willing to predict a wage reduction will come very shortly."

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Information on this subject can be obtained by writing:—

The Industrial and Resources Department Canadian National Railways
TORONTO :: ONTARIO

EDITORIAL

LIFE'S LITTLE WORRIES.

As we go to press, the strike which took place on the 7th instant, at the plant of the Garden City Press, Ste. Anne de Bellevue, where this journal is published, still continues. The circumstances leading up to the strike are made sufficiently plain in the correspondence between the publishers and the Montreal Typographical Union No. 176, which we publish elsewhere in this issue.

At the moment, this journal is, naturally, being produced under substantial handicaps owing to this occurrence. Accordingly, should it not reach its usual standard for a few weeks, we must ask the indulgence of our readers and advertisers and friends generally. There is the best reason for believing that, in a very short while, the difficulties, at present attendant on its publication, will have been completely overcome.

POWER FOR THE GOLD MINES.

There is a growing belief that a solution of the power problem in Northern Ontario will be found shortly. One journal the "Northern Miner" ventures to predict that by Jan. 15th "the power difficulties of Porcupine camp will be solved and all operators will be able to plan future expansions and resumptions of work on as large a scale as they please". We hope that the "Miner" is right, for in our opinion there is nothing that will help the gold mining industry so much as a satisfactory solution of the power problem. Every day that there is a shortage of power there is a loss to the mining companies and to the people of the Province. Every day's delay in proceeding with the expansion of mining operations that can only be undertaken if additional power can be found is an important loss. An end to the power shortage will be hailed with delight not only by the management and shareholders of mining companies, but by every citizen who realizes what the possibilities of the mining industry are and the direct or indirect benefits that will result from increased activity.

More power means greater production of ores such as are being mined and production of ores that may under conditions be left unmined. Greater production means increase in number of workmen and larger pay rolls. Greater production means additional millions of dollars to be disbursed by mining companies for supplies. Merchants and manufacturers as well as shareholders of the operating companies and of others that may operate will be benefited by the finding of the additional power required.

The fact that gold mining companies at Porcupine need more power and that one of the companies has been endeavoring to obtain the rights to develop more power has been well known for many months. The fact that many industries are in difficulties owing to lack of market for products is as well known as the fact that there is no glut in the market for gold. The fact that many men are out of work is as well known as the fact that the gold mining companies could and would employ more men if they could obtain the power they need. The fact that the Ontario Government has been in a position to materially assist in increasing production and in providing employment is as well known as the fact that it has delayed action for such a length of time that it has shaken faith in the minds of men who have believed that Ontario knew enough about the mining industry to require that the things which can be done by Government to aid in development should be done.

In defence of the Government it should be stated that the power rights applied for by the Hollinger company had previously been applied for by a pulp and paper company and were also considered as a possible source of power for the electrification of the Ontario Government Railway. It is easy to understand that subdivision of power rights to satisfy the demands of industries and the needs of the railway would [illegible] some sections considered and that it might take a little time than necessary and that further delay will [illegible] seriously on those responsible for it. Prompt action

would enable us to continue to claim that Ontario has not only great mineral resources, but a people who appreciate the benefits that will come from their development. The delay that has already occurred has caused some to doubt whether the present Government realizes that the lack of power is holding in check plans that call for great increase in production and which in their fulfilment will in many ways assist in the development of districts tributary to the Government railway. This may have been the case last summer; but the Government has had plenty of opportunity since to become informed as to the situation.

The recent announcement that investigation was to be carried on to determine the power needs of the Government railway and the power available near the railway has a bearing on this matter. It has been learned that decision on the Hollinger application is to be withheld until the Government has a report on the results of this investigation. This seems a plausible explanation of the delay, but is not a very satisfactory one. Power for the railway must be found if it is to be electrified; but there is as yet no shortage of undeveloped waterpowers north of Cochrane.

When it is borne in mind that the successful development of this district and the successful operation of the railway depend very largely on the success of mining and pulp and paper industries, it is obvious that the power requirements of these industries should receive prompt consideration. Where interests clash there should be real effort to find a solution without undue delay. If the Government can show that it is making an energetic effort to obtain the information necessary for a decision that will remove the check on development of resources, it should do so.

That the present Government is not unaware of the possibilities of the north is indicated by its decision to proceed with the extension of the Government railway north of Cochrane. This extension will give access to an area well stocked with pulpwood, open up additional agricultural land, and provide transportation to a point on the Abitibi river where there are great power resources. The mineral resources of the area to be traversed are as yet unknown and will not easily be determined, owing to the fact that a thick clay blanket covers the Archean rocks of the area. Further extension will bring the railway into the area of sedimentary rocks in which gypsum has been found and will open up a new field for exploration for oil. Then further extension will bring the steel to tidewater and a new era of development will begin on the shores of Hudson Bay. The Government is to be congratulated on its decision to undertake to carry out this enterprise.

The extension of the railway and the operation of the present line will result in profit or loss according to the speed with which the natural resources of the area are developed. The establishment of new industries and the success of the present industries will determine the success of the railway enterprise. Under the circumstances the Government cannot properly avoid the responsibility of encouraging development. The problems will be many and varied and the Government will find it necessary to move faster in dealing with them, if it wishes to attract enterprising men to explore and develop the country.

CHANGES AT HOLLINGER.

It has been known for some time that the Hollinger management is seriously considering important changes in crushing plant. As at other gold mines in Northern Ontario, there is accumulated evidence at Hollinger that the desired increased capacity can best be obtained, when there is power available, by a change in crushing methods. Manager Brigham has been watching the performances of crushing mills very carefully and doubtless with a view to determining whether the company should continue its present practice when making additions to plant. Our impression for some time has been that the experience of other companies operating gold mines in Northern Ontario was decidedly in favor of the McIntyre type of mill. The early tests at the Hollinger were apparently more favorable to stamps and consequently stamps were installed. Since then there has been more evidence in favor of ball mills and the champions of stamps in Porcupine are not many. Mr. Brigham has naturally wished to make his milling plant as highly efficient as possible, but has doubtless hesitated to make radical changes under the conditions which have confronted gold mine operators in recent years. We were not surprised to hear him say publically in Toronto last week that the plans for increasing capacity at the Hollinger call for important changes in crushing plant.

An inovation at Porcupine will be the filling of stopes with tailings from the Hollinger mill. This Mr. Brigham states has been decided upon. It will provide waste filling of suitable character and will to a considerable extent lessen the tonnage of tailings that must be stacked.

OPPORTUNITIES AT PORCUPINE.

Now that the three big gold mines at Porcupine are making a showing that contrasts sharply with industrial inactivity in many parts of the country, there is more general recognition of the fact that gold mining is becoming an important industry. The possibilities of developing more mines at Porcupine have improved. As Mr. A. F. Brigham said recently:

"The Porcupine district should be carefully and minutely examined by intelligent and hardy men, assisted in every way by the Provincial technical departments and other public service organizations."

It will not be surprising if during the coming year there is a renewal of exploration activities in the Porcupine area. Recently there has been evidence that two undeveloped properties will be tested this summer. It is quite possible that important discoveries will be made on properties that are close to the producing

mines. There is much to be learned, before it will be safe to place limits on the possibilities of Porcupine. For some years there has been comparatively little exploration work in the area, and it has been to easily assumed that the good ore deposits have all been found.

ON TO THE BAY.

We append a description of a part of the area north of Cochrane which will be traversed by the Ontario Government railway which is reaching out towards Hudson Bay.

From Cochrane the road will run north through Glackmeyer and Blount townships, crossing the Abitibi and its tributary Sucker river. Then turning to the west the railway will cross Jawbone Creek and then Trappers creek and follow along the east bank of the Abitibi river for a few miles. Then below the Carrying Places the railway will cross to the west bank. Then at a distance three or four miles west of the river it runs roughly parallel the river, almost due north, to Burntwood portage, which is a few miles above New Post.

With the exception of the river crossings, the route selected will make construction easy. The grades are moderate and the cuts mostly clay. Good agricultural land, liberally supplied with lime from the Paleozic rocks to the north, will be traversed for the greater part part of the distance. The rivers crossed will be advantageously used in bringing out pulpwood from large areas.

The rocks underlying the area are Archean. The clay covering is very thick and rock exposures are few. Description of the rock exposures and of the clays will be found in a report recently published by the Ontario Department of Mines. "The Abitibi and Mattagami Rivers". This report by J. G. Cross, M. Y. Williams and Joseph Keele is accompanied by a map of a large area. Copies of the report and map can be obtained on application to the Department of Mines, Toronto.

Tenders for construction of the first section of the railway have been called for and are to be opened today, January 9th. It is expected that the work will be carried on energetically this year.

SPROUTING PORCUPINE "QUILLS".

By ALEXANDER GRAY.

Accompanying semi official confirmation of our forecasts that Hollinger Consolidated Gold Mines crushed more than a million tons in 1921—how much more cannot be ascertained at the moment—is the announcement that the Nipissing Company drilling at the Rochester Veteran claim has been productive of significant results and that the Platt Veteran claim is about to be taken over by Montreal interests.

If the million tons taken out of the Hollinger area was replaced in a year of confusing operating conditions—owing to power difficulties and labor shortage during the earlier months—perhaps some one in authority, other than Old Reliable Gibson will register the honest to goodness opinion that these mines are wholesaling in gold and branching out in the business. This does not imply that Porcupine retail mines are not faring well and in due proportion. But extracting more gold in the year than others have altogether in their estimated reserves — and then having the warehouses replenished — when it is borne in mind that the Hollinger was handicapped in the first half of the year, gently suggests, ever so gently suggests! that Bankers and Business men devote a thought or two, possibly a day or two for a visit to Hollinger-McIntyre-Dome areas, if not to those at Kirkland Lake. Hollinger is abreast of the best.

Rochester Veteran claim results, however inconclusive as to actual tonnage, are welcomed because they may mean the active co-operation of Nipissing capital and technical skill in Porcupine affairs. Off and on for twelve years Nipissing tried ground here and there, to find it wanting in desirable attributes. It always has been regrettable that this company did not entertain one or two central Porcupine sections more seriously. However, the Rochester Veteran, drilled and discarded ten years ago, has disclosed features of more merit than previous holders surmised, and it has escaped comment that the Nipissing enterprise has increased the importance of the Hollinger- Millerton northern area, and may be of the town site owned by the Canadian Mining & Finance Company, the Hollinger holding company. Is the Timmins-McMartin-Dunlap luck going to have another exhibition? If so, the purchase of a bit of the sand belt for townsite purposes would prove most fortuitous. On the other hand, Charlie Flynn and those of his principals who drilled the Rochester will be entitled to commisseration.

As for the deal with the Platt Veteran claim south of Pearl lake; it is in process of consummation. There, again, earlier drilling and prospecting were undeterminative. An influential group of railway contractors and manufacturers have held this ground. Had the Schumacher come up to expectations, the Platt might have been further along. Plenaurum also was a disappointment on the north side of Pearl Lake and on its eastern axis. Drilling on the Goldale ground east of the lake having given encouragement, it is not improbable the Platt will assert itself more affirmatively.

ALBERTA COAL IN B. C.

Alberta coal is coming into competition with the product of Vancouver Island and the Nicola-Princeton Fields. Evidence of this has been marked in recent weeks, in fact ever since a reduction in freight rates was announced. Operators of the adjacent prairie province are having their coal tested in a number of the vessels engaged in the mercantile trade of the north pacific. They believe that, if it can be shown that their fuel is as good for steaming purposes as that of the Island, it will be possible, by underselling, to obtain a grip upon the market now controlled by the collieries of the coast.

A few weeks ago a reduction in the retail price of domestic coal was announced in Victoria and Vancouver. The drop amounts to 50 cents a ton. Under the old rate [illegible] coal sold for $12 a ton and [illegible] at $13 a ton.

LEBEL CRYSTAL.

Mr. H. S. Ross, president of Lebel Crystal Gold Mines, who was in Toronto recently on his way to New York, reports that very good results have been obtained in surface work at the property. The company holds a block of eighteen claims in Eastern Lebel Township, south of the Moffatt Hall property.

Strike at Garden City Press

Correspondence between the Publishers of the Canadian Mining Journal and the Montreal Typographical Union No. 176.

Editorially we make mention of the fact that there is a strike at the plant where this paper is published. The principles at stake are made clear in the following correspondence which sufficiently explains itself.—Ed.

The Union Ultimatum.

Montreal, December 17, 1921.

To the Board of Directors
Garden City Press:

Gentlemen:—

Notwithstanding the fact that the management of the Garden City Press has not at any time signed an agreement with this Union, it has nevertheless always conceded and operated under the terms of the contract made between the employing printers' associations and the Union.

One of the clauses embodied in all of these contracts is as follows: All employees of the composing room... shall be members of Typographical Union No. 176...

Previous to the expiry of the most recent of these contracts on June 30th last an effort was made to inaugurate the 44-hour week, and the Garden City Press was one of a number of offices where the shorter work week was then established. Because of the failure to procure this condition in other offices a proportion of our members was barred from working in these offices. Anticipating such a contingency the advisability of creating a defence fund was foreseen and an assessment of ten per cent. was levied on all earnings.

Advantage of the situation thus created was at once seized by certain parties to extend the activities of the National Catholic Syndicate to the printing industry, and four of our members of the Garden City Press were influenced into joining this Syndicate, and the reason or excuse given for their action was that they found it impossible to continue paying the said ten per cent. assessment.

Repeated attempts were made by the officers of this Union to dissuade these men from severing their connection with the I. T. U. and the President of the Garden City Press himself pointed out to them the inadvisability of their contemplated severance. Argument and persuasion, however, were of no avail and apparently these men could not be made to see that they were refusing to support their fellow-members in an effort to procure what they themselves were enjoying. Investigation proved that in one case at least it was a repetition of history as the same trouble was encountered in the struggle for the 48-hour week. At that time, of course, there was no Syndicate into which to drift.

The argument that the action of these men was likely to disrupt the relationship existing between the management and the Union was likewise unheeded. The men evidently felt secure in their position and were callous to the results of their action on the other 75 per cent. of the employees in the composing room and on the management.

With set purpose of endeavoring to re-establish former conditions, and of maintaining, if possible, the friendly relationship, no steps were taken to withdraw the members of the Union from this office. Until Tuesday of this week, December 13th, there were excellent hopes that the situation could be adjusted, but on that day two other men were added to the composing-room staff who were not members of this Union, and it was then decided that as matters seemed to be getting worse instead of better, our members should be withdrawn.

As the result of an interview with the President of the Garden City Press, it was agreed that yet another effort should be made to adjust matters, and a request was made for a statement from the Union setting forth the minimum conditions under which an agreement might be reached, and that such statement would be placed before a specially summoned meeting of the Board of Directors. This statement is herewith set forth:

> That the composing-room staff shall be restored to its former standing and only members of the Typographical Union be employed therein; this to imply that the four men first mentioned above may re-establish their membership and the two men recently engaged be discharged or, should they prove to be competent printers, make application for membership.

It may be permissible to state further that we have, for the past three weeks, borne the railway expenses of our members who are travelling from the city daily, and this may be taken as an indication of our willingness to do our utmost to save the situation.

It is the sincere desire of the members of the Union that the previous cordial relationship between the management of the Garden City Press and the Union may remain inviolate.

Truly yours,

THOS. BLACK.

Montreal, December 31, 1921.

J. J. Harpell,
President Garden City Press,
Ste. Anne de Bellevue, P.Q.

Dear Mr. Harpell:—

Owing to developments in the situation at Garden City Press, and having regard to the fact that the action out of which the trouble originated, is not likely to be favorably adjusted, it is the opinion of the Strike Committee that our members can not longer be permitted to work under existing conditions, I have therefore to notify you that the members of this Union now working at Garden City Press will be withdrawn on the evening of Thursday, January 5th, 1922.

The situation can only be saved on the understanding that conditions immediately revert to those existing at June 30th, 1921—namely, all members employed shall be members of Montreal Typographical Union No. 176, and conditions of contract as verbally agreed to shall be observed.

Very truly yours,

2 THOS. BLACK.

The Publishers' Reply.

Gardenvale, Jan. 4, 1922.

Mr. Thos. Black,
President, Montreal Typographical Union 176.
Room 35, Herald Bldg.,
Montreal, Quebec.

Dear Mr. Black:—

The ultimatum submitted with your favor of the 31st, just received, comes as a great relief. It puts an end to a situation that is becoming intolerable.

So that there may be a chronicle of the facts leading

up to this condition, I will rehearse them here and if I make any statement to which you take exception please let me have your version.

Up to the 30th of June and for a month thereafter the relations between our company and your Union were most friendly. We were the first and the only large printing plant in the district of Montreal to grant a forty-four hour week; in fact, we gave it without being asked. We have always paid better than your scale of wages and working conditions in our shop are of the best.

All went well while our men continued their membership in your Union and submitted to the tax of ten per cent of their wages to support those of your members who were on strike from other shops that had refused the forty-four hour week. Your Union had given its members to understand that five weeks would be the limit of this tax and all our men here continued to pay to the end of and even beyond this period, but when your Union failed to keep its promise your working members began to grow restless and many of them, both here and elsewhere, dropped their membership. Some of the French members of your Union took out membership in the National Catholic Syndicate. At that time we gave your officials access during working hours to the men in our plant who had dropped their membership in your Union. In fact, we did what we could to help you persuade them to renew their membership. This we did against our better judgment: first, because we realized, as did your seceding members, that when a strike is allowed to drag on beyond a reasonable time it becomes increasingly difficult to secure a settlement in the interest of the strikers. Those who take the place of strikers become more and more efficient while men on strike suffer a lapse of skill and acquire habits of indolence and indifference that make them less desirable when they are ready to return to work. This is particularly true of men in receipt of such handsome weekly allowances as your Union has been paying it's strikers.

Our second reason for feeling that your Union did not deserve the assistance we gave it in trying to persuade the men in this shop to continue their membership in your Union was supplied by your Vice-President, Mr. Hayes of Indiana, U.S.A., when he swore, at our meeting with him in Montreal at the Windsor Hotel, last autumn, a determination to "teach the Catholic Church a lesson" for what he interpreted as their interference in labor matters. Whatever may have been Mr Hayes' grievance against the Catholic Church or any other church, we did not consider that we had any right to assist him to teach them a lesson.

When you failed to persuade your men to renew their membership by peaceful means, you appealed to us to use coercion by threatening them with dismissal. This we absolutely refused to do. From this time on there was a very noticeable persistent demand on the part of our superintendent here for more men, although there was no increase in our work. With the advent of every increase in our force there really seemed to be a decrease in the output and our costs began to mount until within a short time they had increased by 52 per cent when the writer found he had to interfere. When the costs continued to go up we found it necessary to dismiss our superintendent. The next man we dismissed was a man on the night staff who was giving a production of less than 500 ems an hour, whereas the minimum, as you know, is from eight to nine times this, according to your own statement. At that time we felt we could not afford to reduce our force so the writer appealed to you for another man to work at night. Instead of one you sent two, a Mr.... and a Mr.... who, you claimed, were very rapid typesetters. The first night their work was fairly satisfactory but the second night they came out well supplied with liquor which they consumed between them and in company with our night pressman. The next morning we dismissed these two men and our night pressman, a man who had been with us for several years and who before that occasion had done his work and conducted himself satisfactorily. The next man we dismissed was a Mr...., an old man of 54 years, who, I understand, has been in the habit of tramping about from place to place and drinking very heavily, with the result that he is never in a fit condition to do a fair day's work. His largest production here in any one day was less than 1,500 ems an hour and some days he went down to below half that per hour. The next man we dismissed was a monotype operator whom we were very glad to be rid of. He did not earn his wages and in many respects was highly undesirable. The last man to go was dismissed because he either did not know his work or he loafed on the job. With all these dismissals we have a larger output today than we were able to secure with the larger staff.

What was very noticeable during the writer's interview with all the above mentioned dismissals was the very great readiness on the part of the men to go. There seemed to be a decided preference on their part to be on strike rather than to be at work. On more than one occasion men whom you have sent out here to look for work have refused a salary of $36.00 for a forty four hour week and declared their preference to walk the streets and receive strike pay of $25.00 a week.

We are rather glad that the break is coming for another reason, namely that it will leave us free to handle our apprentices in the future in the way we think they should be looked after. The unreasonable regulations of your Union regarding apprentices have shut out the best class of young men and women from the business of typesetting and resulted in a rapidly increasing preponderance of old men in your organization. There is nothing more unsatisfactory than your regulation which limits a shop of the size of ours here to three apprentices in five years. And it was very annoying a few weeks ago when we took on the fourth boy in five years to have the head of your Chapel come to my office and request that he should not be allowed to go to work. In order to avoid trouble I acquiesced and the boy was sent away. We have many bright young boys in this community who are anxious to learn the business of typesetting but they will be old men and women before the opportunity comes to them if we continue to recognize the apprentice regulation of your Union. Since [illegible] we have been anxious to start a school for apprentices and it is good to look forward to a beginning of this sort.

I trust you have not been led to believe by the statements presented above that we are in a mood to throw up our hands and quit. This we are not in the habit of doing until the last gun is fired in an effort to do our whole duty and we feel that we still have a duty to the members of your Union who have been with us long for years and who are satisfied with conditions here and with the fellowship of their co-workers who are not members of your Union. They have to-day said and everyone signified their willingness to continue in our employ if a strike is not called.

As a final effort at an amicable settlement we have approached the Department of Labour at Ottawa with the request that they communicate with you in the hope of gaining your consent to the appointment of a Board of Arbitration and Conciliation for the arbitration of the question on which you threatened to call a strike, as

your letter of the 31st. In order that they may have all the facts of the case we are by concurrent mail writing them as per enclosed copy herewith and sending them a copy of this letter, together with a copy of your letters of the 17th and 31st of December.

Yours very truly,

J. J. HARPELL.

Union Comments on Publishers' Letter.

Montreal, January 10th, 1922.

Dear Mr. Harpell:—

In your letter to me of date Jan. 4, in which you ask to chronicle the facts leading up to the present situation existing in your plant, you ask that if I take exception to any statement to inform you of same. I now avail myself of that privilege and would seek to correct some misstatements in the hope that the chronicle may finally appear strictly according to fact.

Referring to Paragraph 4 of your letter I must emphatically deny that this Union gave its members to understand that the ten per cent. assessment would not extend beyond five weeks.. You evidently have been misinformed on this point.

In Paragraph 5 allusion is made to a conversation with Mr. J. W. Hays. I was not present at the time of the conversation but Mr. Whitaker and Mr. Gauthier inform me that what Mr. Hays did say was that "If the Catholic Church or any other church or any other organization sought to interfere in Labor matters the I. T. U. would teach them a lesson."

Paragraph 6 contains numerous statements that I am unable to refute or confirm. It would be difficult to adduce necessary evidence. Speaking personally I cannot recollect suggesting coercion. However, this is a fine point and does not materially effect the matter. In reference to the superintendent of the plant it is my opinion that Mr. Philip and myself were informed at the time that the superintendent of the plant had resigned and had asked that his resignation might take immediate effect. It was also stated that the superintendent had been requested to take two or three weeks vacation instead of resigning his situation. This opinion was confirmed by the superintendent on Saturday, Jan. 7.

Regarding these two operators referred to, I must say that two men were sent at the request of the management of the Garden City Press.

So far as their first night's work is concerned, the statement that their work was "fairly satisfactory" is not a generous statement, the work of one of the men that night was regarded as an extraordinary night's work. The second night's work was unsatisfactory and I sincerely regret the attested cause.

It is impossible for me to attach the blame for this supply of liquor.

So far as Mr.... is concerned, he states that the condition of the machine was the cause for the small output. How far this is correct I cannot say. I believe, however, that an investigation will show that this particular machine is not in a satisfactory condition and that continual trouble is encountered with the electrical appliance.

On taking up the matter covered in Paragraph 9, our members inform me that none were willing to continue at the Garden City Press under existing conditions. Were former conditions to obtain they admit that they would certainly have been pleased to remain.

In reference to the suggested appointment of a Board of Arbitration, I have to state that: As it was a principle that was involved, and not hours or wages, the matter could not be submitted to a board. This was explained personally to the Minister of Labor.

In conclusion, let me say that the Union did not hastily decide its final action. Every effort has been made to have matters amicably adjusted and the final decision was come to only after mature consideration and much patience.

Might I ask that in the event of your chronicle being modified according to the explanation herein set forth, you will forward such to the Minister of Labor so that the previous chronicle may be withdrawn.

Yours truly,

THOS. BLACK.

Publishers' Rejoinder.

Gardenvale, Jan. 12, 1922.

Dear Mr. Black:—

Really I cannot see much, if any, difference between the account given in my letter of January 4th and that set forth in yours of the 10th instant, just received.

The statement about the five weeks was made in your presence by Mr.... and you did not correct it. But this is not a material point. The fact remains that the only reason given by your seceding members was that they refused to continue to pay the strike assessment your Union was levying.

As regards Mr. Hayes' statement, your version of it suits the reference made in my letter of the 4th.

The word "coercion" was my own, and used to interpret your demand that I should force the seceding members back into your Union by threatening to dismiss them. This was the cause of the whole trouble, for when I refused to dismiss or even to threaten them with dismissal, you called a strike.

The facts concerning the superintendent leaving were these. On Saturday, December 17th, I told him that matters were getting into such a condition that I would have to take charge of the work myself until things were adjusted and that during this period I did not want him around. If he would go away on a two or three weeks holiday the company would pay his expenses, but if he refused to do that he would have to hand in the keys on the following Monday morning. He handed in the keys on the following Monday morning.

I consented to two men because, as you will remember, you thought one might be lonely. As it turned out they proved to be jovial companions, particularly when they had a supply of liquor. I used the words "fairly satisfactory" because the production of these two men at no time was over 4,000 ems per hour per man, which is the minimum an average man might be expected to set.

The machine Mr.... used has been continuously operated since he left with satisfactory results.

I can only repeat that each and every one of those who went out from our shop when you called the strike told me they were well satisfied with conditions here and that they would not quit unless they were called out by the Union. Of course, the fact that they did continue to work right up to the time when the Union called them out is evidence in itself that that was the only cause for their quitting. They were free to go at any time they wished.

I consider your version does not contradict but corroborates the statements made in mine of the 4th.

Yours truly,

J. J. HARPELL.

Mr. Percy Hopkins has prepared for the Ottawa meeting of the Mining Institute a paper on the gold deposits of Ontario.

GENERAL PURPOSE CRAWLING TRACTOR CRANE.

An Account of the Development of This Product of Industrial Works, Bay City, Michigan.

The type BC "Industrial" Crawling Tractor Crane, illustrated in the accompanying photograph, manufactured by the Industrial Works, Bay City, Michigan, has been developed to meet the need for a full-revolving tractor crane which can be operated independently of rails. The crane is built in two types—the type BC, with a capacity of 20,000 pounds at 12 ft radius, equipped with continuous crawling tractor belts ft. radius, equipped with four broad gauge tractor wheels.

the type BT, with a capacity of 18,000 pounds at 10

These cranes, backed by half a century of crane-building success, are pre-eminently adapted to the needs of road contractors, coal dealers, gravel, sand and stone producers, foundries, lumber yards, railroad storage and reclamation yards and moderate-size manufacturing plants. The capacity and speed of these cranes make them ideally suited for doing such jobs as moving coal, sands, gravel, etc., and for excavating duty. Within the limits of their capacity they will serve with the same efficiency as the railroad crane.

The maximum utilization of yard storage space is realized with the use of these cranes because their field of usefulness is not limited by railroad tracks, as is the case with the railroad crane. Having exceptionally large capacities in ordinary lifting they prove a valuable adjunct in the many erection jobs which are inaccessible to the railroad crane. They can be equipped to handle a hook and block, grab bucket, drag scraper bucket, wood grapple, electric lifting magnet shovel dipper and pile driver leads with drop hammer.

Operation is by means of an internal combustion engine which has the advantage of being always ready for immediate use. When not in operation no fuel is consumed and it is not necessary, as often with a steam operated machine, to have a licensed engineer as operator.

The utmost care has been used to combine the necessary strength with the light weight essential to a tractor crane and convenience in operation and maintenance have been provided to the highest possible degree. Realizing the vital importance of ease of operation in getting the most work out of locomotive cranes study has been made of the requirements of the operator and everything arranged with a view to making the operation and maintenance of the crane as easy and convenient as possible.

The crane is equipped with a thirty-foot boom, made up of two channels strongly latticed with angles and tie plates. Also, if desired, crane can be equipped with 35 ft. or 40 ft. boom. With straight boom not to exceed 30 ft., the crane standing on firm level ground, the following loads may be safely hoisted and slewed in a full circle:—

20,000 pounds at 12 ft.
15,000 pounds at 15 ft.
10,000 pounds at 20 ft.

Can be Handled on Single Line.

7,500 pounds at 20 ft.
6,000 pounds at 30 ft.

A steel cab, neatly and substantially constructed, is furnished. This has necessary doors and windows giving protection and comfort for the operator, yet unobstructed view of his work.

The slewing motion is accomplished through a system of spur and bevel gears working into the rack on the carbody. The direction of rotation is controlled by two friction clutches of very substantial design and is entirely INDEPENDENT OF ALL OTHER MOTIONS. A foot brake is provided to prevent involuntary rotation of the crane.

Raising the boom is accomplished through a friction drum on the main drum shaft. The motion is positive in its action, and is easily controlled by the operator.

Type BC "Industrial" Crawling Tractor Crane.

by means of a single hand lever operating both a friction clutch to hoist the boom and a brake which lowers and holds the boom. Full rated loads may be raised or lowered by this mechanism with ease and safety.

The steering of the car while propelling is accurately controlled by the operator from his position in the revolving upper-works, by manipulation of the friction clutches and brakes controlling the motion of each tractor belt, while boom is swung at any angle with the car. By means of these clutches and brakes either belt can be readily and instantly disconnected from the motor while the other belt continues travelling at a normal rate of speed. The disconnected belt can be held stationary by applying the brake, can be allowed to coast with the brake and clutch both disengaged or the clutch can be allowed to slip, thus allowing the operator to turn as sharp or as wide a corner as he may select. Crane will turn within a radius of approximately its own width, depending somewhat on the nature of the ground. All the clutches, brakes and lever mechanism for steering are located in the revolving upper-works with separate and independent driving mechanism for each tractor belt. This arrangement is simpler and much more accessible than when a portion or all of these clutches, brakes and lever mechanism is located below the car-body.

The propelling and steering mechanism is a new and exclusive feature of the "INDUSTRIAL" CRAWLING TRACTOR CRANE, and is fully protected with patents applied for. It enables the operator to propel and steer the crane, INDEPENDENTLY OF ALL OTHER MOTIONS, with the greatest possible ease and accuracy.

The propelling mechanism is especially powerful in the "INDUSTRIAL" CRAWLING TRACTOR CRANE, allowing it to travel up steep grades and over heavy going. The large tractor belts distribute its weight so it travels with equal facility over city pavements, ordinary dirt roads and industrial storage yards. These belts allow the crane to readily pass over railroad tracks and larger obstructions. Of especial convenience to contractors, is this crane's ability to propel itself up an inclined skidway onto a flat car, where it may be transported without dismantling further than to remove the boom and the projecting muffler.

The overall height of the crane with muffler removed is 12 ft. 6 in. The width over tractor belts is 9 ft. 9 1-8 in. The rear end will slew within a circle of 9 ft. 6 in. radius from the centre of revolution.

The surprisingly low cost of owning and operating a crane of this type affords the smaller industrial institutions an opportunity to handle bulky materials speedily, safely and economically.

Northern Ontario Letter

THE SILVER MINES

Information coming to hand through reliable mining circles confirms earlier statements in the Journal that officials of the British Government early in 1921 made suggestions to the United States Government, looking to some arrangements whereby the price of silver might be stabilized at a reasonably high price. However, no action appears to have been taken and the quotations for the metal have appeared to find their level at not far above the average prevailing during the decade immediately preceding the recent war.

Metal authorities continue to point to the fact that the consumption of silver is still far greater than current production, and this is the one factor which continues to encourage the hope that the price of the metal may record a substantial advance during the current year. The more conservative mining men, however, believe that the law of equilibrium will work out along the lines of decreasing cost of production resulting in more intensified effort and a general rise in output.

Nipissing

Production of not far under one million ounces of silver during the last quarter of 1921 placed the Nipissing in a still better financial position, the company now having a surplus of around $4,000,000. The company will pay a dividend of 3 p.c., plus an extra disbursement of 3 p.c. on Jan. 20th, the double payment calling for the distribution of $360,000. The indications appear to be that the Nipissing will continue to pay 3 p.c. dividends at intervals of every three months, plus the 3 p.c. extra disbursement in January and an extra of the same amount in October, making a total of 18 p.c. for the year.

Oxford-Cobalt

High grade ore has been encountered in a two-inch vein at the 75-ft level of the Oxford-Cobalt property, and a limited amount of ore has already been bagged which contains an average of about 500 ounces of silver per ton. The vein lies in the diabase formation and is composed of calcite, cobalt and native silver. Plans are under consideration to continue the work to a deeper level and explore the vein in a part of the keewatin-diabase basin at a lower horizon.

Coniagas

During the fiscal year ended Oct. 31st, the Coniagas Mines established the outstanding record of having handled an average of 3.38 tons of ore per day for each man on the pay-roll. Production for the period amounted to 1,301,515 ounces of silver, as compared with 994,235 ounces during the preceding year, the increase being due to an increase in the tonnage of ore treated. Net profits for the year totalled $422,238 compared with $512,380 in 1920. The ore was mined and milled at an average cost of 33 cents for each ounce of silver produced, compared with a cost of 48.98 cents during the preceeding year, this being the most remarkable part of the year's achievement. Dividends during the year amounted to $800,000, making a total of $10,840,000 to date.

Including the treatment of sand and slimes, the tonnage handled amounted to 4.2 tons per man on the pay-roll of the Coniagas. A favorable feature of the report is that mill heads average 11.30 ounces of silver per ton. Another favorable feature is that a large tonnage of low grade milling ore was developed during the year, although the amount of broken ore on the stulls was reduced by 2,300 tons. Altogether, the year's operation was entirely satisfactory.

After making allowance for depreciation, the company shows a surplus of $1,695,889.78 at the end of its fiscal year.

The Coniagas now has a total production record of 29,490,277.73 ounces of silver.

Right of Way

John Matheson, formerly with the Aladdin-Cobalt has been engaged to superintendent work on the old Right of Way property. The Right of Way Company recently went into liquidation and the property is now being operated by the Right of Way Syndicate.

South Lorrain

Arrangements have been made between the Mining Corporation of Canada and the Keeley Silver Mines to have the Temiskaming Telephone Company erect a telephone line to the Haileybury Frontier property and the Keeley mine, the companies going fifty-fifty on the cost estimated by the Telephone Company.

Trethewey

It is stated that the Trethewey-Cobalt Company will endeavor to raise additional finances by the incorporation of a new company with an authorized capitalization of $2,000,000 made up of 2,000,000 shares of the par value of $1.0 each. There are 1,600,000 shares outstanding in the present company and the proposal is to eall in four of the old for each one of the new issued. This would only absorb 400,000 shares of the new company and would leave 1,600,000 in the treasury. It is proposed to sell these treasury shares at 10 cents per share and thereby realize $160,000 with which to pay off the present indebtedness of some $40,000. and the balance to finance further work

Promise of power development at Fort Matachewan is considered to be important for the Gowganda district should a revival of aetivity take place.

La Rose

It is understood that production of silver from the properties of the La Rose Consolidated exceeded 100,000 ounces during the year just ended. It is also intimated in unofficial circles that net profit exceeded $5,000 per month, as compared with a total of $1,000 during the year 1920. Good results have recently been reported on the University, while the shaft on the Violet property has been deepened to a new level and with promise of lateral operations proving the downward continuation of important ore shoots. The La Rose has shown a substantial decline in the cost of producing silver and this will be reflected in the balance sheet for the year.

Hollinger

Perhaps the outstanding piece of information coming to the attention of the Journal representative during the current week is the fact that the Hollinger Consolidated Gold Mines, not content to handle 4,000 tons of ore daily, is not only considering an increase to 5,000 and 6,000 tons but is actually aiming at a maximum of 7,000 tons This information was secured from reliable sources, following a visit to the property by Noah Timmins, president, together with Jules Timmins, director, and a number of other interested parties During the visit at the mine the party, which was made up of between 20 and 30 members, were shown some moving pictures which have been taken by "Pathe's" and which are understood to be excellent It was also learned that provided the requisite hydro-electric power is available and which now appears to be probable, the Hollinger will establish a record in the current year which will not alone eclipse its 1921 achievement but will actually outstrip its only world rivals on the Rand and will lead the world in point of output.

Northcrown

Action is being taken by creditors against the Northcrown Mines of Porcupine, something like $100,000 being involved. This is believed to arise as a result of the failure of the Thompson-Krist interests to meet their obligations. By way of explanation it may be well to point out that the Northcrown Mines Company with an authorized capital of $3,000,000, made up of 3,000,000 shares of the par value of $1.00 each was incorporated for the purpose of taking over the Porcupine Crown and the Thompson-Krist mines, the arrangement being that the Porcupine Crown would receive 2,000,000 shares of the new company and the Thompson-Krist would receive 1,000,000 shares. The scheme was carried through, and the Northcrown commenced the operation of both properties. Cash on hand was limited and arrangements had to be made to borrow money. The Porcupine interests advanced a certain amount, but the Thompson-Krist was unable to advance its share and this led to other credit being secured. Subsequent failure of the Thompson-Krist to make good has resulted in action being taken against the Northcrown by a Toronto Trust Company.

McIntyre

Order for equipment in connection with the installation of a new unit in the mill of the McIntyre have been placed and the prospects of the mine's production being increased in the spring at the rate of another million dollars a year are good. Application has been made to list the stock on the New York market and this is serving to advertise the enterprise to the end that the value of the stock on the open market has recently experienced a very substantial advance.

The power dispute

This week has witnessed the launching of the action of the Hollinger against the Northern Canada Power Company for alleged failure during the winter of 1920-21 of the power concern to supply the full requirement of its contract to provide all the energy that the Hollinger might require. Until the trial advances it will be diffficult to outline the basis of defence on the part of the power company, but the general opinion in the district is that the defence may be based upon the statement that it was only by act of Providence that more power was not available in that the season was one of the driest in the past half century and not only resulted in power shortage at Porcupine but also made itself felt seriously in practically all parts of eastern Canada where hydro-electric energy was being generated Something like a million dollars is stated to be involved in the action.

Lake Shore

On January 6th the Lake Shore mine sent out one of the largest shipments of gold bullion in its history the total amounting to approximately $71,000 and representing over five week's production It is also learned that during the month of December the mine produced upwards of $57,000, thereby establishing the biggest record for any one month's production in its history, this achievement comparing with over $51,000 in November which was heretofore the record The feature of present results on the Lake Shore mine is that mill heads are averaging well over $30 per ton, and that development work is proceeding in an important way to the size of the mine.

Wright-Hargreaves

During the month of December, the Wright Hargreaves mill showed a still further increase in the amount of ore treated, the daily average being 175 tons and the total for the month approximating 5,425 tons. Mill heads ranged between $11 and $12 to the ton and thereby indicate an output of upwards of $62,000 for the month.

Ontario-Kirkland

Following the breaking of a gear on the hoisting machine on the Ontario-Kirkland mine which resulted in two delays, the hoist was again set in operation on January 6th and the mill turned over again on the 7th. About 1,000 tons of ore already in solution as a result of the two short periods of operation, and with the plant now under steady operation the first clean up will take place in February. The indications appear to be that owing to the ore being softer than on the mines along the main break, the mill may reach a capacity of around 110 to 120 tons instead of 100 tons daily as designed. Also, the indications appear to be that the ore will average around $11 per ton and would indicate an output at the rate of not far under $40,000 per month when running steadily. Two ore shoots at the 300-ft. level are each about 200 feet in length and contain good values across a width of about five feet. At the 450-ft. level, there are three ore shoots, two of which are each quite close to 200 feet in length and one being 70 feet in length. At the present time a working level is being opened up at a depth of 150 feet and this will provide a total of three levels from which to draw ore. This week the work of connecting the 450-ft. level with the 300-ft. level will be completed and by the end of the month ore will be drawn from the 450-ft. level through the main shaft.

Wages reduced

Not far under four thousand men now employed at the gold mines of the Porcupine and Kirkland Lake districts will experience a wage reduction of about 10 p.c during the current month. This reduction is the first to be made in the gold mining districts of Northern Ontario since the upward trend commenced during the war. This reduction compares with a 15 p.c. cut in the silver mining districts last spring, and a 12 p.c. reduction on the railways recently.

The operators of gold mines deferred the cut until such time as the cost of living showed a substantial decline and, also, until suffering a substantial shrinkage in income resulting from the premium on gold sold on a par with United States Currency.

The total pay-roll at the gold mines has recently exceeded a rate of $5,500,000 annually, and will, under the new rate, amount to over $5,000,000 a year.

EXPLORING FOR OIL IN MACKENZIE AREA.

Results Disappointing, But Not Discouraging.

Efforts to develop commercial production of oil in the Mackenzie River basin have so far proved disappointing but not discouraging, according to A. M. McQueen, vice-president of the Imperial Oil Company, who recently made an exhaustive survey of attempts to discover commercial oil in the Canadian far-north before the session of the Engineering Section of the American Association for the Advancement of Science in the Electrical Building of the University.

"In summing up our experience," said Mr. McQueen. "I can only say that we are disappointed, but that we are not discouraged and we are going on in the hope that we may some day feel that we have contributed to making Canada independent in its resources of a commodity of vital importance.

"Despite the amount of capital which has been invested and the engineering and drilling problems which have been encountered, the company has not been successful up to the present time in developing a commercial production of crude oil. In the Fort Norman, No. 1 well, we obtained a small production, which only demonstrates the fact that oil exists in that region. Under more favorable conditions at some other location in that territory we hope to obtain a larger production, but time only can justify this prophecy."

It was a romantic story the speaker told of the fight between the forces of modern science and industry and the difficulties imposed by nature over a territory where the temperature was as often as not forty degrees below zero. One example aroused the intense interest of the audience. A crew of one of the big monoplanes used in maintaining communications became stranded 900 miles from their hangar with a broken propeller. With the aid of an old cabinet-maker, who happened to be a resident of the district, a new propeller was fashioned out of oak used for Eskimo sleds and glued together with glue obtained from the hide of a moose. The make-shift proved to be successful and the plane returned to its base none the worse for its mishap. It was such instances as that declared Mr. McQueen which demonstrated the difficulties of operating over thousands of miles of practically deserted country.

TRUSSED CONCRETE STEEL CO., OF CANADA, LTD., WALKERVILLE, ONT.

Due to the resignation of Mr. G. B. Reynolds, who has left the Company's employ to engage in other pursuits, a change has been necessitated in the management of its Montreal office. Effective January 1st, 1922, Mr. A. St. C. Ryley, formerly General Sales Manager of the Company, succeeded Mr. Reynolds as Manager of the Montreal territory with offices at 323 Drummond Building, 511 St. Catherine St., W., Montreal.

THE MINISTER OF MINES.

Hon. Charles Stewart, ex-Premier of Alberta who has been appointed Minster of the Interior and Minister of Mines, is a farmer who has taken an active interest in public affairs in Alberta. He has served as Minister of Public Works and as Minister of Municipal Affairs in his Province. Mr. Stewart was not a candidate in the Federal elections and he will have to secure a seat in the Commons. Mr. Stewart was Prime Minister of Alberta previous to the provincial elections last Summer, which returned the United Farmers to power in his place, although he himself was elected by acclamation for Sedgewick, and it had been expected that he would take his place in the Provincial Legislature as leader of the Liberal Opposition.

Alberta returned to Parliament eleven Pogressives and one Labor candidate, who had Progressive endorsation.

PERSONALS.

Mr. Hugh L. Kerr, elected to the Board of Education in Toronto, in the recent civic elections, is well known in mining circles, and was in at the first rush to the Cobalt district. He was one of three University of Toronto men who staked out the University Mine, and a short time later sold out to a syndicate for approximately $1,000,000. Mr. Kerr graduated from the University of Toronto in 1903, and was a lecturer there for two years.

METALLURGICAL MILLENIUM IMMINENT.

By ALEXANDER GRAY

Being the greatest of the Genii of the Lamp, Thomas A. Edison is an iconoclast. His scientific achievements relegated many graven images to the refuse heap. Not so long ago he could exterminate whole armies were it not too terrible for words to have him attempt it. Earlier than that he contemplated making cobalt continuously commercial and saleable in huge quantities; so he bought a property in the Portage Bay district, of unhallowed memory, thinking to use cobalt in the perfection of his storage batteries. Latterly, having become intimate with Henry Ford—who was obsessed with the idea that all he had to do was to go over and stop the war before a certain Christmas, Mr. Edison is convinced the transmutation of metals, is about to be demonstrable. It having been chemically proven that lead, instead of being "a single metal, as has been supposed, contains two ingredients instead of one," Mr. Edison proceeded to exterminate the gold standard and to dethrone gold as a precious metal, in this ruthless manner:

> "Discovery of how to make gold artificially may be made any day, I have said this for years. This new discovery is part of the solution of the problem I have always felt that the gold clause in bonds is dangerous. This clause provides that the bonds shall be paid in gold of a certain degree of fineness. What would the people who own railway bonds say if they should wake up some morning and find that gold could be manufactured as cheaply as we now make pig iron? Well, that is exactly what will happen some day—and it may happen any day."

Synthetic diamonds, rubies and other gems, cultured pearls, manufactured diamonds, are trivialities in contrast with the triumph of wizardry foreshadowed by the necromancer of Menlo Park. Mr. Edison never has been an alarmist. Ramsey, however, within recent years was equally positive transmutation was being effected. Kelvin, another scientific idealist, chased chimeras until his worldly belongings were dissipated. Wernher thought Lemoine was upon the eve of producing diamonds in quantities to order.

Of course, telephony has been revolutionized; Tesla, Edison and Marconi worked magics; but to take away the foundation stone of international credit, and make of gold a cheap, artificial metal, would leave bankers and bondholders so speechless that they could not make reply to Mr. Edison's query.

Gold has been the cherished standard of value since gold, frankincense and myrrh were gifts for and from the gods. The craving for it is accredited with being the cause of all good and ill. Possession of it, or its equivalent, has been the motive power behind the nations. A non-corrosive, convenient, governed by factors of cost of production and comparative scarcity, it has been the surest medium of giving and obtaining value for value—now Mr. Edison serves it the mustard gas and is a "bear", a "crab" on gold mining! He does not intimate—nor could he at this stage—the first cost of gold. Factory prices would govern. Perhaps too, manufactured rarer metals will make radium and platinum bu gain day features. Research, too, may provide the means for replenishing the earth with minerals ready to be mined and transmuted.

In that event, another wizard—a Ukranian electrical engineer, Chayko—will have supplemented Mr. Edison's pentecostal pronouncement in behalf of bimetallism without limit. Chayko is not inimical to the gold factory as Mr. Edison foresees. By a "simple apparatus" he sends sourdoughs and hardy annual prospectors to the hump by "grouping what are termed the 'locked power lines' of the magnetic field into parallel rays which can penetrate mountains, thereby avoiding the necessity of high antennae," all of which "will enable the location from the surface of metal deposits," etc., etc.

Even the tolerated geologist is to be innocuous disuetude, as President Cleveland once put it, when the magicians of the laboratory and the furnace bring the world to the end of the rainbow, switch on the Chayko apparatus—the spot light instead of the twig, or divining rod—and supply the raw material in place. Means for quantitive and qualitative analyses without resort to the diamond drill or development will eliminate unessential mining engineers.

Science classes—not overlooking faculties—then will concentrate on the whichness of wherefores—and degrees may be conferred for theses on the Nothingness of Past Sciences. Meanwhile the Cross with Palms goes to Chayko. Edison must bring the proofs—in car lots!

CALIFORNIA'S GOLD OUTPUT.

California's gold production in 1921 was 761,660 oz. valued at $15,744,910. For a time in July it looked as if the mines along the Mother Lode, particularly those near Nevada City and Grass Valley, which are among the largest-producing deep mines in the State, might be forced to close because of labor troubles. These troubles, however, were finally adjusted, and a wage scale was established to hold until June 30, 1922. This scale $4.25 a day for machine men and $3.75 for shovelers, has been more or less generally adopted throughout the State.

RUSH TO ELBOW LAKE.

The Pas, Man., Jan. 5. The rush to Elbow Lake gold camp, 75 miles north of here, continues, and nearly 500 claims have been staked. Many prospectors have gone in and during the last week 11 two-horse freight teams and approximately 50 dog teams have left here with supplies.

The Hollinger Company of Porcupine, holder of the $150,000 option on the Murray claims, have taken in complete supplies and a gang of 25 men, who will start immediate development of the property.

A number of claims near the original Murray discovery, which had been overlooked owing to heavy timber surrounding it, have been found by G. R. Bancroft and he has accepted an offer of $75,000 from a Toronto syndicate for his holdings.

NEW WAGE SCHEDULE.

Sydney, N.S., Jan. [illegible] That only actual miners will be included in the new schedule of wages and working conditions to be made by the Dominion Coal Company with the United Mine Workers of America, is the No. 26, was the statement here last night by H. J. McGuire, Assistant General Manager. According to Mr. McGuire the company wishes to eliminate from the contract [illegible] men, railway section men and others not connected with actual mining operations, but who have been entered on previous United Mine Workers' schedule.

British Columbia Letter

Mines did well under adverse conditions. Large lead output. Small decrease in zinc. Large gold output. Decrease in copper. Decrease in silver. Slight decrease in coal.

By ROBT. DUNN.

It is estimated by Hon. Wm. Sloan, Minister of Mines, that the value of the Mineral Production for 1921 will approximate $25,780,608. This is $9,762,476 less than in 1920, or a decline of about 27 per cent.

These figures, it is stated in the course of the annual review in which Mr. Sloan discusses mining conditions in British Columbia during the past year, are most encouraging. That there should be a reduction was to be expected. The general prediction was that it would be much greater for the reason that the metal markets for months have been so weak that many of the large smelters and refiners of the American Continent have found it impossible to keep their plants in operation. Under the circumstances it is considered remarkable that this Province should have been able to so well maintain the general average of production.

Outstanding Features.

There are several outstanding features in connection with the 1921 history of the industry. One is the record of the Sullivan Mine at Kimberley, which is strikingly reflected in the statistics relative to the output of lead and zinc; another the splendid performance of the Hidden Creek Mine and the Anyox Smelter, which is shown in the volume of the copper production; and a third in the development in the Salmon River Valley, Portland Canal, of a gold and silver producer of first importance, the contribution of which to the precious metals produced by British Columbia for the first time gives an indication of what may be expected from this and other properties being opened up in this comparatively new northern mining section.

During most of the past year, and still in marked degree, world conditions from the viewpoint of the metalliferous mining have been unsatisfactory. Europe, which consumes the greater proportion of the world's copper product, has been unable to buy the metals of America and, as a result, the largest producers of copper in the world reduced their output to about 20 per cent of normal. Much the same has applied to lead and zinc. These facts remembered it is the more remarkable, and gratifying, that the 1921 production of Lead is estimated to be 3,668,782 lb. greater than in 1920, the figures being: 1920, 39,331,218 lb.; 1921, 43,000,000 lb.; that Zinc will drop in volume only about 2,208,268 lb. in comparison with the records of the previous year; and that even in Copper, for which there was little or no market, the decrease was not greater than approximately 10,607,676 lb.

Mr. Sloan observes at this point that the manner in which this Province has held her own in respect of three of the basic commercial metals, in the face of almost unprecedented adverse conditions, is a convincing commentary on what can be done when the trade winds are more favourable and furnishes an admirable illustration of what the future holds for the mining industry of the country. It was only a few months ago that at an International Mining Convention at Portland, Oregon, the American delegates held a session apart from the Canadian delegates to formulate resolutions advocating a tariff against Canadian lead and zinc. That the mining men south of the line then were beginning to realize that British Columbia was becoming a factor to be figured with in competition on the world's markets was evident. Their fears, it would appear, are justified for the industries of this Province still are producing and marketing notwithstanding the slight margin between profit and loss under present conditions.

A detailed statement in which the 1920 output is compared with the estimated production of 1921 is given as follows:

	1920		1921		
	Amount	Value	Amount	Price	Value
Gold-placer	.....	$ 221,600	.....	$20.67	$ 220,000
Gold-lode	120,048	2,481,392	136,000		2,935,140
Total Gold		2,702,992			3,155,140
Silver	3,377,849	3,235,980	2,550,000	60.23	1,611,152
Copper	44,887,676	7,832,899	34,280,000	12.4	4,127,312
Lead	39,331,218	2,816,115	43,000,000	4.08	1,754,400
Zinc	47,208,268	3,077,979	45,000,000	3.83	1,723,500
Total Metall.		$19,665,965			$12,371,504
Coal	2,595,125	12,975,625	85 p.c. of 1920		
Coke	67,792	474,544	Estimate by Chief Inspec.		11,432,644
Total for Collieries		13,450,169			
Miscell. Minls	.....	250,490			200,000
Bldg. Materials	.....	—2,176,460			1,776,460
		$35,543,084			$25,780,608

Estimated decrease in value from 1920 .... $9,762,476
Approx. 7 per cent.

The Canadian Miners' Buying Directory.

Acetylene Gas:
Canada Carbide Company, Ltd
Prest-O-Lite Co. of Canada, Ltd.

Acetylene Welding:
The Toronto Iron Works, Ltd.

A.C. Units:
Powley & Townsley, Limited.

Agitators:
The Dorr Co
Can. Chicago Bridge & Iron Co., Ltd.
Horton Steel Works, Limited.

Air Compressors:
Belliss & Morcom, Ltd.
Laurie & Lamb

Air Hoists:
Canadian Ingersoll-Rand Co., Ltd
Mussens, Limited.

Air Receivers:
The Toronto Iron Works, Ltd.

Alloy and Carbon Tool Steel:
Peacock Brothers Limited.

Alternators:
MacGovern & Co

Aluminium:
Spielman Agencies, Regd

Amalgamators:
Northern Canada Supply Co.
Mine and Smelter Supply Co
Wabi Iron Works.

Antimony:
Canada Metal Co.

Antimonial Lead:
Pennsylvania Smelting Co

Assayers' and Chemists' Supplies:
Dominion Engineering & Inspection Co
Lymans, Limited
Mine & Smelter Supply Co.
Pennsylvania Smelting Co.
Stanley, W. F. & Co., Ltd

Ash Conveyors:
Canadian Link-Belt Company

Ashes Handling Machinery:
Canadian Link-Belt Co., Ltd.

Assayers and Chemists:
Milton L. Hersey Co., Ltd
Campbell & Deyell
Ledoux & Co.
Thos. Heys & Son
C. L. Constant Co.

Asbestos:
Everitt & Co.

Balls:
Hull Iron & Steel Foundries, Ltd
Peacock Brothers Limited.
The Wabi Iron Works.
The Hardinge Conical Mill Co
The William Kennedy & Sons, Ltd.

Ball Mills:
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd
The Wabi Iron Works.
The William Kennedy & Sons, Ltd.

Babbit Metals:
Canada Metal Co
Hoyt Metal Co.

Ball Mill Feeders:
Hardinge Conical Mill Co
Hull Iron & Steel Foundries, Ltd

Ball Mill Linings:
Hardinge Conical Mill Co
The William Kennedy & Sons, Ltd.
Peacock Brothers, Limited
Hull Iron & Steel Foundries, Ltd

Belting—Leather, Rubber and Cotton:
Canadian Link-Belt Co., Ltd.
The Mine & Smelter Supply Co
Northern Canada Supply Co
Jones & Glasco.

Belting:
R. T. Gilman & Co
Gutta Percha & Rubber, Ltd

Belting—Silent Chain:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal
Jones & Glasco (Regd.)

Belting (Transmission):
Goodyear Tire & Rubber Co

Belting (Elevator):
Goodyear Tire & Rubber Co

Belting (Conveyor):
Goodyear Tire & Rubber Co
Gutta Percha & Rubber, Ltd.

Bins and Hoppers:
The Toronto Iron Works, Ltd.
Can. Chicago Bridge & Iron Co., Ltd.
Horton Steel Works, Limited.

Blasting Batteries and Supplies:
Canadian Ingersoll-Rand Co., Ltd
Mussens, Ltd.
Canadian Explosives, Ltd.
Powley & Townsley, Limited.

Bluestone:
The Consolidated Mining & Smelting Co
The Coniagas Reduction Co., Ltd.

Blowers:
Canadian Fairbanks-Morse Co., Ltd
Northern Canada Supply Co.

Boilers:
Canadian Ingersoll-Rand Co., Ltd
Marsh Engineering Works
R. T. Gilman & Co.
The John Inglis Company
Wabi Iron Works.

Blue Vitriol (Coniagas Red):
Canadian Fairbanks-Morse Co., Ltd

Bortz and Carbons:
Diamond Drill Carbon Co.

Boxes, Cable Junction:
Standard Underground Cable Co. of Canada, Ltd
Northern Electric Co., Ltd.

Brazilian Rough Diamonds:
Diamond Drill Carbon Co.

Brazilian Mica:
Diamond Drill Carbon Co.

Buggies, Mine Car (Steel)
Hendrick Manufacturing Co

Brazilian Ballas:
Diamond Drill Carbon Co

Brazilian Rock Crystal:
Diamond Drill Carbon Co.

Brazilian Tourmalines:
Diamond Drill Carbon Co

Brazilian Aquamarines:
Diamond Drill Carbon Co.

Bridges—Man Trolley and Rope Operated—Material Handling
Canadian Mead-Morrison Co., Limited

Bronze, Manganese, Perforated and Plain:
Hendrick Manufacturing Co.

Buckets:
Canadian Ingersoll-Rand Co., Ltd
R. T. Gilman & Co.
Hendrick Manufacturing Co
Canadian Link-Belt Co., Ltd
Marsh Engineering Works
Mussens, Ltd.
MacKinnon Steel Co., Ltd
Northern Canada Supply Co.
The Wabi Iron Works

Buckets, Elevator:
Canadian Link-Belt Co., Ltd
Hendrick Mfg. Co
Peacock Brothers Limited.

Cable—Aerial and Underground:
Canada Wire & Cable Co
Northern Canada Supply Co
Standard Underground Cable Co. of Canada, Ltd
Peacock Brothers, Limited

Cableways:
Canadian Mead-Morrison Co., Limited
Fraser & Chalmers of Canada, Ltd
Mussens, Ltd.
The Wabi Iron Works
R. T. Gilman & Co

Cages:
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que
Northern Canada Supply Co
Fraser & Chalmers of Canada, Ltd
The Electric Steel & Metals Co
The Mine & Smelter Supply Co.
Mussens, Ltd.
The Wabi Iron Works

Gold Output Increased.

In reference to the precious metals it is mentioned as a matter for congratulation that there is a probability of an increase in the production of gold, 136,000 ozs. as against 120,048 ozs., this applying to lode mining. The figures as to the placer fields are not yet available to such an extent as to permit an estimate. The output should, however, be about the same as in 1920 so that the total yield is expected to be in excess of the previous year.

There were months during which silver was quoted on the world's markets at an exceedingly low figure and over this period many of the mines, small and large, of the Kootenay and the Boundary District were compelled either to close down or to curtail operations to nothing further than development. More recently the demand for the white metal has been reviving, largely because of the Oriental demand, in which part of the world distrust of currency is more than usually deep rooted. This has resulted in a rising market and increasing activity in the silver mining camps with a more promising outlook.

Attention is directed to the marked difference in metal values as between 1920 and 1921 as proving that the expected decline shown by the past year, in a monetary sense, is not to be taken as a fair estimate of the comparative achievements of the two years as to production. On this point a self-explanatory table of average metal market prices is given:

Average Market Prices.

	Silver	Copper	Lead	Zinc
1920	100.9	17.45	7.95	7.67
1921	63.4	112.41	4.53	4.62
Percentage drop in 1921	37.17	28.94	43.10	39.77

Value of 1920 Production at 1920 prices $16,962,973
Value of 1920 Production at 1921 prices $11,674,980
Theoretic diminution of value due to lower prices $ 5,287,993
Percentage 31.2 p.c.

These figures show that should the output of those metals in 1921 exactly equal the quantity produced in 1920, the metal prices for 1921 would reduce the money value of such output by 31.2 p.c. This means that in 1920 on an average the miners received nearly 50 p.c. greater an amount than for a similar quantity of metals in 1921.

This is the financial handicap from outside sources that our mines have had to meet throughout the year. To partially meet this there has been a slight decrease in the cost of wages and supplies used in mining.

(To be continued)

NORTH EASTERN B. C. SHOWS INCREASED PRODUCTION,

That, despite adverse conditions, there will be an increase in the tonnage mined in the North Eastern Mineral Survey District of British Columbia is the encouraging report of Mr. George Clothier, resident mining engineer. This section comprises the mining divisions of Bella Coola, Skeena, Queen Charlotte, Naas River, Portland Canal, Stikine, Liard and Atlin. The first three are on the coast and the latter lie behind what is known as the "Alaska strip." Included in the area are the Premier Gold Mining Co., The Dolly Warden and other Alice Arm properties, the Granby Company's Mine and smelting plant at Anyox, and the placer mining fields of Atlin.

Increase in gold, silver and copper.

It is estimated that the increase in tonnage mined will amount to about 75,000 tons. The gold output, exclusive of placer which will just about equal last year, will show an increase of approximately 30,000 ozs., or about 60 p.c. greater than last year. This is due to the gold production of the Premier God Mining Co. of Stewart. The silver yield for this year will be about 1,500,000 ozs., or about 125,000 ozs., greater than last. This is due entirely to the output of the Premier Mine for the Dolly Varden which gave over 800,000 ozs. last year produced practically nothing this year. The Premier's output of silver will be over a million ounces alone. The copper production will exceed that of last year by nearly 9,000,000 lbs., an increase of about 33 p.c., and due altogether to the Granby Co. at Anyox.

Notwithstanding the deflation of the prices of metals, the total value of the three metals produced in this District, (gold, silver and copper,) will be greater than last year. In fact, taking quantities, not values, into consideration, this year,s will be the greatest production ever made in this district.

Granby produced 34,280,000 lb. copper.

The Granby Cons. N. S. & P. Company's output is slightly less in gold and silver but away ahead in copper. It is estimated that their production this year will be about 34,280,000 lb.. of copper against 25,405,000 in 1920.

The goldskeish Mining Co., though operating only a small property, has doubled its gold and silver output.

The Dolly Varden has been the disappointing mining feature of the year, shipping only what ore was left broken in the stopes and chutes.

The Premier Gold Mining Co. of Stewart will produce about $1.750,000 in gold and silver, divided about evenly, in 1921. This should be indicative of her capacity for some years.

The Belmont Surf Inlet Mining Co. produced about 10,000 ozs. less in gold than last year, with silver and copper about the same.

The placer output will be about the same as last year.

The Maid of Erin, in the Rainey Hollow section, has shipped some ore but the exact tonnage is not yet available. This had to be hauled by tractor about 60 miles to tidewater at Haynes. Development work on the property this summer has made it look very promising.

Activity in the Kitsumgallum Lake section is assured for next season and the section is giving good promise.

It must be concluded from the foregoing that the general financial depression and deflation of metal value has had practically no deleterious effect on the mining industry in this part of the Province, in so far as operating and shipping properties are concerned. It, however, would have been a different story had such a calamity as the closing down of the Granby plant at Anyox occurred. With the increasing price of copper this property now should have no difficulty, comparatively speaking, in keeping the wheels moving. About the only notable difference between this year and the past two or three years has been the lack of capital for the condition of development by the smaller operators, and for new undertakings.

EDITORIAL

THE STEFANSSON EXPEDITION.

Exploration in the Far North is difficult under any circumstances but it can be made absurdly difficult by mismanagement. The stories that are being published concerning the Stefansson expedition should result in better organization of future expeditions to the frozen seas. The men who did the work on the expedition have refrained from public criticism for a long time but are now aroused by the explorer's criticism of their actions. An enquiry into the matter will be necessary and is expected to reveal an interesting story.

In an interview published in the Globe, Mr. J. J. O'Neill one of the party says:

"When we reached Nome, Alaska, our starting point for the Far North, we found a terrible old whaler awaiting us. We were astounded, for we had been specially told that a modern, well-equipped vessel was to be put at our disposal. Stefansson had made the purchase, which he evidently considered good enough for us, but he had taken great pains to make the Karluk, the northern party's vessel, the finest fitted-out ship that ever left for Polar seas.

The Alaska, as ours was called, was in such a dilapidated state of preservation that the inhabitants of Nome were actually making wagers as to how long it would remain afloat. But what could we do? If we drew back at that stage of the game we would undoubtedly be accused of cowardice.

"Then came the question of receiving our share of the supplies which had been stored at Nome prior to our arrival. Stefansson took nearly two-thirds of these, and practically all the provisions. He had purchased, for example, with the Government's money, approximately seven tons of pemmican, a specially prepared food. Of this huge supply he generously allowed us 1,000 pounds. Clothing, etc., secured by the Department of Naval Service, he distributed on a four-to-one ratio. But this was not all, he also appropriated every available sled and dog that Scotty Allan, the celebrated Nome 'musher', could find. He excused himself by saying that we could easily get along without them, as our work would not take us off the continent.

"I have not yet read his new book, but I have been given to understand that he has made an attack on me for criticizing his actions at this place."

"After the loss of his Karluk," said Prof. O'Neill "he joined our party at Collision Point. As it was his intention to form a new enterprise to explore Beaufort Sea via the ice route, he demanded what was left of our 1,000 pounds of pemmican, etc. Our refusal to allow ourselves to be crippled so that he might be outfitted afresh, I believe he describes as 'insubordination,' if not actual 'mutiny'. In fact, I have been advised that in his book he attributes his failure to accomplish more to the manner in which we kept 'continually hindering him.'"

"I am not surprised that Dr. Anderson, no longer able to keep silent under these unjust accusations, has publicly denounced him. The Government may now consider a full inquiry justified."

THE OLD STORY AGAIN

Commenting on the revival of interest in gold mining, a Toronto newspaper recalls that some years ago an eminent British scientist said that the existence of gold in Ontario was geologically impossible. Every now and then someone tells this story, with variations to suit the circumstances. On occasion the reference is to silver instead of gold. The purport of the story seems to be to discredit science in its relation to industry.

Now we make no claim that scientists do not make mistakes. We have no doubt that there have been eminent scientists who do not know very much about gold deposits and that there are others who do not know very much about the geology of Ontario. We doubt very much, however, whether any eminent scien-

tist stated that "the existence of gold in Ontario is geologically impossible." Some pseudo scientist may have made such a statement, but no scientist worthy of the name presumes to dictate to nature. He may draw conclusions from observed facts; but he cannot pursue scientific studies without realizing that theories are but a means of grouping together known facts and that the tenability of a theory depends entirely on the known facts.

That gold exists in Ontario has been known for many years. Its existence was never an impossibility. Any person who said it was so, must have been in a peculiar mental condition. He would properly be designated by two words of four letters each. If it was an eminent scientist who made the statement, it must have been received by his friends with more concern for his future than for the gold industry.

We refer to this matter because we believe it not to be in the best interests of the industry that science should be discredited. The gold mining industry in this country is only possible because science has been applied to it to a marked degree.

A NATIONAL PROBLEM.

Elsewhere in this issue will be found an article by Mr. W. M. Goodwin on the Canadian iron industry and what he very aptly terms the national problem that it presents for our consideration. We commend a perusal of this article to our readers. Not only is is (if we may say so) written with admirable lucidity and precision but it is also admirably constructive in purpose. Some of our readers may disagree, in part, and perhaps in large part, with the conclusions at which Mr. Goodwin arrives and with the solution he suggests of the well-known difficulties which have hitherto defeated the attempts to found an independent Canadian iron industry. But, in our view, it is undeniable that he has made a contribution of considerable value to the discussion of a subject which is of national importance.

Whether or not the methods which Mr. Goodwin describes as having been so eminently successful in solving a not dissimilar problem in Sweden would meet with a like measure of success in this country is a question on which, in the absence of more amplified information than we possess as to the details of the operation of the iron industry in the former country, and (we may add) without fuller consideration than we have been able to bring to bear on this aspect of the subject, we should not like to commit ourselves. But, *prima facie*, Mr. Goodwin has made out a case which challenges attention and investigation. And, speaking generally, we find ourselves in hearty accord with his contention that the bringing together of as many as possible of those directly or indirectly interested in our iron and steel industry with a view to forwarding the interests of the same is the right way to go to work. It is sound in principle and should not prove too expensive in practice.

We are all of us too apt to think of industrial problems as admitting only of known solutions. The truth, however, as most of us, if pressed, are constrained to admit, is, of course, quite otherwise. Great as have been the accomplishments of science in its relation to industry, particularly (as we point out editorially elsewhere in this issue) within the last fifty years, we are yet, in all probability, but on the threshold of many of its most brilliant triumphs in this regard. The seemingly impracticable of today may be the veriest common-place of tomorrow. For science never speaks its last word. What science may have to say on the question of new methods of smelting especially adapted to our natural resources may, very possibly, be well worth our hearing as a solution of the problem of our iron industry. But, at least, we should strain every nerve to catch its accents.

As our readers are well aware, we have consistently emphasized the necessity of adequate tariff protection for the iron and steel industry while we are under the necessity of importing iron ore and coal into Canada. Not less consistently have we maintained that the existence of an iron and steel industry of our own is demanded by Canadian national sentiment. But, at the same time, we should heartily rejoice if Canada could have a flourishing iron and steel industry of her own without being under the necessity of importing iron ore or coal. If a radical and drastic revision of our smelting methods should obviate the necessity for the use of imported coal for smelting; and if new smelting methods could be devised whereby the use of domestic ore might be made a commercially paying proposition, then science would have made an outstanding contribution to the solution of a baffling and perplexing problem. Until then, at any rate, protection, by means of the tariff, is essential. But science should certainly be given its chance to do what in it lies to solve the problem along the lines indicated.

TROUBLE ON THE RAND.

The great gold mining industry of South Africa is passing through a critical period. The high cost of production and the inefficiency of the workers, white and colored, is causing the mine operators much concern. It is anticipated that important changes will have to be made to avoid closing down more of the mines.

The proposed changes relative to the employment of white and colored labor, are evidently not liked by the miners. At this distance, however, it would seem necessary that changes that will bring greater efficiency must be made and that the employees will have to meet the operators half way if the industry is to flourish again.

It has been announced that a conference, presided over by Gen. Smuts, is to be held shortly. We hope that good results will come from this and that we will soon find more pleasant news in reports from Johannesburg. The Government realizes the seriousness of the situa-

tion and will doubtless make every effort to help operators and workers find a way out of the present situation.

THE FUTURE OF GOLD MINING.

In an article contributed to the Annual Industrial Review published by the "Globe", Mr. A. F. Brigham, manager of Hollinger Consolidated Mines Ltd., states that with reasonable encouragement the production of gold in Ontario may be advanced to such a figure that the performance of 1921 will look in retrospect like a small beginning. To bring about such progress there must be an "intelligent understanding of gold industry problems by the public generally, and a practical sympathetic attitude on the part of the public's servants." When it is recalled that Ontario is now producing about $1,200,000 gold per month, some idea of the possibilities of gold mining in the Province as viewed by Mr. Brigham may be grasped. We have some large producing gold mines, but under favorable circumstances it is likely that we will have many more and larger producers.

COPPER MINES REOPENED.

The Calumet and Hecla Mining Company has announced that it will open four of its Michigan copper mines about April 1st. This company operates the Calumet and Hecla mine and several mines of subsidiary companies. The four mines referred to are the Calumet and Hecla, Ahmeek, Allonez and Isle Royale. These are all mines that were operating on a large scale a few years ago and resumption of operations will mean employment for a large number of men in the copper district who are now experiencing great difficulty in finding work. In the Michigan copper mining district the news will be as welcome as would be in Sudbury an announcement of resumption of work at the nickel mines. It is an indication of improvement in the copper market and evidence of faith in the future of the mining industry.

NEW MODDERFONTEIN AND HOLLINGER.

An Informative Analogy.

By ALEXANDER GRAY.

To those of us who have survived the switchback of Mining — with all its rough riding — experienced its thrills and chills — the receipt of a report such as the New Modderfontein company of the Witwatersrand present, vividly recalls emotions akin to those of the moment when it was my indelible privilege to hand to Dr. Molengraaf — an outstanding Crystallographer — the Cullinan Diamond, and to say to him:

"Name the baby, Doctor"!

The tall, scholarly Hollander, ex-State Geologist of the Kruger Government, took the lustrous lump, fondled it, adeptly focussed it, scrutinized the structural lines of that more than 3,000 carat crystal, made a rough sketch showing the two planes of fracture, and then pronounced it to be a magical gem, worth millions according to established bases of valuation, with the greater portion flawless. Those Molengraaf keen blue eyes sparkled, as a mother's would with her first-born, it was with manifest reluctance that he passed the limpid bauble to "Tom" Cullinan. The biggest of its kind was not for the Doctor's collection. It went to the Crown Jewels.

New Modderfontein data, the record doings of a mine that will surpass all previous performances at the Rand, with which the Hollinger Consolidated Gold Mines of Porcupine have begun, only begun, mind you, to vie, are no less exhilarating. To June 30, the company had paid £7,000,000 in dividends, which compares with £12,000,000 from the smaller area of the Robinson. The difference being, however, that New Modderfontein is not at maximum virility, while Robinson is being interred. After producing about $100,000,000, and distributing better than a third of that, conservative estimate makes the ore reserves between 25,000,000 and 28,000,000 tons, worth approximately $225,000,000 to $240,000,000. Ultimately, about twenty years hence, New Modderfontein may have contributed a third of a billion dollars. Those who revel in comparisons will have a clearer perspective as to what that grand aggregate means, when they think that New Modderfontein as a profit may contribute in value as much as Cobalt silver and all Ontario gold mines have at this writing. From 28 per cent of its claim area New Modderfontein last June had milled 9,750,000 tons for $100,000,000, so the remaining developed and undeveloped 903 claims may provide a further $250,000,000 from which a divisible per ton profit of £1 is possible. Dividend visitations are assured. In 1920-21, the distribution was 100 per cent.

Yet there are those who will have it that "a mine is a hole in the ground with a liar on top", that all precious metal mining, like vice, is a "monster of such hideous mien: to be hated needs but to be seen". Of course Witwatersrand areas lend themselves to close approximations as to ore contents. Not every area though, is a New Modderfontein a Robinson, Ferreira, Crown Reef, or even a Robinson Central prize-winner in tabloid. Nor are there many companies recutting a recovery of 98 per cent of the gold although it is a common-place to have technical men invidiously decry Rand Engineers and Managers. Such high extraction is worthy of attainment by others provided the cost of the added saving be economical or balance.

Because Hollinger crushings and plants are undergoing revision upwards these New Modderfontein results have special interest. In one respect present Hollinger shareholders have the advantage in that they have received 55 per cent in dividends, taking their shares at parity, whereas those shares were issued at 5/- or New Modderfontein has paid 185 per cent.

From now on, Hollinger holders, owing to the larger capital of Hollinger Consolidated, are looking for still better things. Undoubtedly expansions are of the making. In this connection it is pertinent to dwell upon the fact that the largest claim holders at the Rand are discarding stamps and amalgamation processes. Consolidated Mines Selection and the New State Areas of the Barnatos realize the great savings to be effected in cost of installations and operations. Hollinger is moving in the same direction. New Modderfontein crushing capacity is about 107,000 tons per month. Hollinger current crushing capacity exceeds that. What will it be before the end of 1922? The limit is off, if the power barrier is removed.

The Canadian Iron Industry

A National Problem.

By W. M. GOODWIN.

The story of our failure to develop an independent Canadian iron industry has been repeated so often that now the only valid reason for further public discussion of the matter is the inclusion of some constructive idea. In this article an attempt is made to present an idea that, though not new, has not been clearly understood by many interested in the problem. In order to present this idea in the proper light, a brief outline is given of the efforts of our pioneer iron-masters, then the building of the present plants is referred to. Instances are given of the unsuccessful attempts to found a truly Canadian industry, and present-day efforts to the same end are mentioned. Finally, the solving of a problem similar to ours in Sweden, two hundred years ago, is described, and a solution of our own problem suggested.

First Attempts at Iron Smelting.

Our pioneer iron-masters were mainly men who had learned their trade in the Old Country, and attempted to apply their knowledge in the new land. If Nature had provided similar conditions, there is no doubt that their efforts would have resulted in permanent success. In Nova Scotia, where coal and ore are in close proximity, we have such a case of continuous development from the pioneer furnace to the modern plant. It is only the discovery of the cheaper Wabana ore that has altered this self-contained Canadian undertaking, though this has likewise allowed of much more extensive operations. Elsewhere we have no such example of continuous development.

A number of the earlier furnaces in central Canada were operated successfully as long as there persisted some special conditions that gave them an advantage over foreign competitors. At first the cost of importing iron from England and the United States allowed a number of the furnaces in Ontario to make money. The failure of supplies of bog ore, and of cheap charcoal, the improvement of transportation facilities on the importation routes, and the development of the modern blast-furnace using coke, in England and the United States, all combined to cause the failure of the furnaces in Ontario and Quebec. Those that made only an average quality of iron quietly succumbed; special quality, commanding enhanced prices, gave a longer lease of life. A number of furnaces making charcoal iron especialled suitable for chilled car-wheels had honourable careers. At Radnor Forges, special quality spelled success, and only recently has metallurgical development encroached upon the market held by its charcoal iron. In general, it can be said that nowhere in central Canada have natural conditions allowed of competition on equal terms with our foreign competitors; and if special advantages exist within our borders that may allow of a native iron industry, we have failed so far to develop them.

Present Iron Industry.

Twenty-five years ago some promoters and politicians, and some business men decided that we should have an iron industry in central Canada. So, under shelter of a tariff, furnaces and steel plants were built, following American practice, and using American ore, but with the hope and expectation that similar ore would be found in Canada in sufficient quantities to meet our needs. This hope has not been realized, and we can now hardly expect our unexplored iron ranges to contain large deposits of hematite. Thus we have left on our hands large plants completely dependent upon American coal and American ore, whose continued operation is possible only on account of an adequate protective tariff. It is true that these plants constitute a natural part of the mid-continental iron industry using Lake ores; but that does not help us Canadians with our problems.

Attempts to Found a Canadian Industry.

Numerous atempts to develop an indigenous Canadian iron industry have been made of late, by both miners and metallurgists.. After exploration had destroyed the confident hope that our iron ranges would be similar to those south of the border, a number of our deposits were opened up and the ore tried in the blast-furnaces. These were uniformly rejected by the furnace operators. In most cases, this was no doubt warranted by the facts; in a few unimportant instances it is still a matter of dispute whether or not the ore can be profitably used.

When the raw ore proved unacceptable at the furnaces, serious attempts were made to "beneficiate" it. The Magpie roasting and nodulizing plant represents a bold experiment that we hope will be of permanent value to the country. By the way, a large part of our fraternity hope that the administrators whom we have placed in charge of our public affairs will see the wisdom of aiding this undertaking by means of a sufficient bounty to ensure its continuance. The Moose Mountain attempt has been revived, and now has the official backing of our Advisory Research Council. The eventual success of the Trenton plant seems more uncertain, as its resources of ore are smaller and less uniform than the other two. The thorough-going attempt to use roasted Stikoban ore having fallen short of commercial success, those interested in the really extensive deposits of the Part Arthur district seem to have adopted a policy of "watchful waiting".

New Smelting Methods.

It is not a new idea that we Canadians should work out methods of smelting specially suited to our natural resources. Dr. Haanel is credited with being the first to push vigorously the idea of the electric smelting of iron ore, which has lately been applied so successfully in Sweden and Norway, Japan and elsewhere. Sjoitedt's atempt to make use of the iron of the nickel ore at the Gertrude mine, with sulphur as fuel, is said to have come very near to success. A somewhat similar attempt is the production of "Nicu" steel at Niagara Falls from lean Sudbury ore or smelter slag. The Tivani experimental plant at Belleville attests an effort to make steel direct from ore. These efforts, and others, have so far failed to result in permanent commercial enterprises. Nevertheless the work goes on, as experimenters and researchers have more than a normal amount of the hope that springs eternal.

Electric Smelting.

The proposal that has been most prominent lately in iron and steel circles is electric smelting. Its

possibilities in British Columbia have been examined recently by Dr. Stansfield. His inability to recommend the venture in that favoured locality would seem to dispose effectually of any such attempt in central Canada, where iron is so much cheaper. The small margin of superiority of electric smelting over other methods, even where conditions are most favourable, is shown by recent events at Domnarfvet in Sweden.

A number of electric blast-furnaces are used there to supplement charcoal furnaces. Just before the war the smelting capacity of the plant was to be increased, and a new blast-furnace to use coke was decided upon. But the war intervened to charge the situation. The price of coke went up, the half-finished furnace was let stand, and electric blast-furnaces were installed instead.

To allow of the establishing in central Canada of an electric smelter ,some new and favourable factor must be brought to light. If the production of "sponge metal" by means of cheap fuel should prove feasible, the electric current will finish the operation; but that will be melting, not smelting. The main posibilities would seem to be in the prodnetion of high-priced material, such as alloy steel.

The Problem.

Our problem in central Canada may be reduced to a few simple elements.

1.—We have at present no natural resources that will allow us to compete on equal terms with the iron masters of the United States, while using their methods of smelting; nor are we likely to find them in unexplored territory.

2.—So long as we are content to import iron ore and coal, we can have a flourishing iron and steel industry, provided we protect it with a sufficient tariff.

3.—We must continue to use imported coal for smelting unless we revise radically our smelting methods.

4.—In order to make possible the use of domestic ore, we must either pay a bounty on its production or use, or else devise smelting methods whereby its use is profitable.

Thus it is obvious that the ultimate solution of our problem lies in metallurgy, the bounty being merely a temporary expedient to stimulate metallurgical effort.

There are two lines along which our efforts may be directed; we may try to make our ores suit the existing blast furnaces, and we may search for smelting methods particularly suited to our ores. Here again we have a question of expediency. As the present furnace plant represent a huge investment, it is probably wise, and certainly easier, to try to alter our ores to suit them. But I am convinced that the sound and far-sighted policy will be to search out smelting methods specially adapted to our ores whereby we can use them to the fullest advantage.

The Problem in Sweden.

Two hundred years ago the iron masters of Sweden faced a problem somewhat similar to ours of today; and they solved it. From ancient times there had been a flourishing iron industry, and the product of the primitive forges and furnaces had carried the name of Sweden throughout the world. Competition from Britain, where cheap coal-made iron originated, resulted in a large part of the Swedish production becoming unprofitable. The iron-masters came together in conference, united for self-defence as "Jernkontored" (Swedish Iron Masters' Association) and then called in science to their aid. The result of a scientific direction of their efforts and of a combination to stimulate trade, has been to keep in operation from that day to this an iron industry that is well-founded and takes full advantage of what Nature has provided. This has been done in the face of difficulties that probably were much greater than those that face us in Canada today.

A Possible Solution.

How can we go about the solving of our problem? I believe we can well take example from the Swedish iron-masters of two hundred years ago. Our iron-masters can unite to study their problems, and can invite the co-operation of the best scientific talent they can find. If one examines the situation today, one finds our iron-masters "sitting tight", after a number of desultory, sometimes poorly-directed, and uniformly unsuccessful attempts to solve the problem, each for himself. What effort is being expended is mainly by men outside the industry, principally those interested in deposits of ore. Why cannot all these get together, and work together consistently until the end of each and all is attained? The problem is a huge one, far beyond the capacity of a single company, not to say a lone individual. The rewards of a successful effort would be so large that there would be something for all concerned, and added self-respect and independence for Canadians of all degrees.

To be more specific, I would suggest the formation of a trade association similar to those that have been formed and operated with such signal success in Britain upon the instigation of their Advisory Research Council. Our own Research Council has stimulated the formation of a Pulp and Paper Association, with research, trade and other departments, and it is reported to be doing very good work. Such an association for our iron and steel trade would be what the C. M. A. is to Canadian manufacturers, and a good deal more as well. It would keep under review trade conditions, tariff, and other matters of common interest. It would examine continuously methods of manufacture and sources of raw material, to keep the whole trade abreast of the times and on the "qui vive" for special advantages. It would supervise and direct in a broad way whatever original investigation seemed necessary. Its officers would act as a competent and sympathetic authority for consultation with independent researchers, and men with ideas. All this, and more, is being done by trade associations in various countries, we have just begun to form them in Canada.

To sum up—I believe the soundest, as well as the least expensive way, to forward the interests of our iron and steel industry will be to bring together as many as possible of those directly or indirectly interested, so that these may pull together toward a result that will be for the benefit of all. A trade association along the British lines offers the best means to this end. Thus we will have a competent authority to shape policies, direct research, and in general get the most of what Mother Nature has to offer us.

Kingston, Dec. 31st, 1921.

PLANT INSTALLED AT PAINKILLER

The properties of Cartwright Goldfields and La Santa Lucia Mines on the shore of Painkiller Lake, have been merged in a new company known as Blue Quartz Mines Limited. Machinery to replace that lost in the fire of 1916 has been installed. Twenty men are employed and we are advised that development is to proceed at once under the supervision of Mr C. H. Taylor.

Interest in this district was a result of the discovery of very rich ore at the Croesus. Surface work last summer resulted in the discovery of several veins. One of these, opened up by test pits, disclosed very rich ore. One shipment of ten bags of ore from this vein to Timiskaming Testing Laboratories (owned by the Ontario Government) averaged $85. gold per ton and 7 oz. of silver. Later test shipments ran $110 and $118 per ton gold. At a depth of 20 ft. in a test pit the vein was twenty four inches wide and one of the miners describes it as being plastered with gold. Following the surface prospecting some diamond drilling was done to locate the veins underground. Seven veins have been uncovered on the lake shore, all carrying visible gold. These veins vary in width from a few inches to two feet.

No. 1 vein, wich was about two inches wide at surface, widened out to a width of 22 inches at a depth of 18 feet. The several veins being nearly parallel, the company intends to run a crosscut to cut all of them. The shaft has been dewatered and retimbered and is now down 110 ft. It is intended to sink to 400 ft. Two drills are now in operation and a considerable amount of lateral work will be done during the coming months. We are further advised that sufficient funds have been raised in Toronto and England to carry out an extensive development program.

The Company is assured of the finest executive management for their organization includes H. C. Crow, President, and C. H. Taylor, Vice-President, Mr. Taylor will supervise all work at the mine and that in itself is sufficient to guarantee that the work will be well done. He is well known in Northern Ontario for the excellent work he accomplished with designing and installing the Hydraulic Power Plant at Ragged and Hounds Cutes which is now operated as the Northern Ontario Light and Power Co. Previous to this he had a wide mining experience in all parts of the American Continent.

Cartwright Goldfields still own two claims of 80 acres North of the Painkiller Lake adjoining the Hattie and it is the intention to commence operations here in the Spring. Cartwright Goldfields owned six mining claims on the south shore of Painkiller Lake, while La Santa Lucia consisted of one claim adjoining. These seven claims have been merged and will be known as the Blue Quartz Gold Mines, Limited., having an authorized capitalization of $3,000,000 made up of 3,000,000 shares of the par value of $1.00 each.

It is authoritatively stated that attractive offers for the property have been refused and that the company will proceed with its plans for development and has under consideration construction of a mill.

MIKADO MINE TO RESUME.

Kenora, Ont. January 14. — Colonel H. A. C. Machin has succeeded in securing the requisite capital to re-open the old Mikado Mine, on Shoal Lake. He has also secured options on the Tycoon and Bulletin properties. The total acreage of the three is 765 Acres. As is well known there is a fairly complete plant on the Mikado and it should not involve any heavy expense to get stamps dropping again. It is said there is enough ore in the bins and blocked out to run the mill (20-stamps) for five months. The tailings are thought to hold gold to the value of $120,000 — assay value $4 a ton.

The Mikado ran in days when simple amalgamation was thought sufficient and ball mills were in the future; it is likely that much closer saving of gold will now be possible.

The outlook for a gradual resumption of mining in this district is bright, but it is to be hoped the wildcatter will not be allowed to spoil it, as happened before; every raseality was practised and every mistake made, but that there are mines, and good ones, as yet to be developed, no one conversant with conditions may doubt.

The Rice Lake gold field in Manitoba, which is after all but a prolongation of this one, to the north west, being on the same general line of outcropping, has two bona fide mining outfits at work this winter. The usual flamboyant advertising is happily absent, but good, steady development is being done. In due time something may be heard of the properties in question.

CHAS. A. BRAMBLE.

Headframe and Buildings Recently Erected at Blue Quartz Mine.

British Columbia Mining In 1921

(Continued from last week).

By ROBT. DUNN.

Little Change in Coal Output.

Comparative little difference is apparent in the production figures for 1920 and those estimated for 1921 in connection with the Coal Mining Industry. In 1920 the output was officially placed at 2,696,774 tons and for the past year it is estimated to be about 2,624,000 tons, a drop of 72,774 tons. The generally slack conditions industrially explain, in a general way, this decline. There is no doubt that in the last few months the competition of foreign fuel oil has had a detrimental effect on the demand for British Columbia coal. When oil was short and high in price coal was required for most of those uses to which the liquid fuel had been applied. Oil burning vessels were converted into coal burners, oil heated buildings were provided with steam furnaces, and the coal mines of Vancouver Island, as well as of the eastern sections of the Province, were kept working at full capacity, giving employment to all who would work, and circulating capital for the further development of this and other industries. With the presence in America of oil in greater quantity than the home market of the United States can absorb the producers naturally have been reaching out for other markets. That they should come to Canada, close at hand and a considerable consumer, was to be expected, but in the case of British Columbia, where there is so much unemployment and where capital is needed so seriously for the development of natural native resources, it would appear to be a matter warranting comment that so many of those who will not make substantial material gain by the change have once more discredited British Columbia Coal in favour of Foreign Oil.

The nature of this competition is further emphasized by the fact that Fuel Oil now is quoted in Vancouver at $2.75 a barrel whereas less than two years ago it was difficult to obtain at any price and the lowest quotation given when available was $3.50 a barrel. Ordinarily it is estimated that it takes three barrels of oil to equal one ton of coal in heat producing values.

The great importance of the coal mining industry on Vancouver Island can be appreciated when it is considered that between 4,000 and 5,000 employees of the companies mentioned find continuous employment underground and on the surface under normal conditions the year through. During 1921, the conditions can hardly be considered to have been normal because the demand for coal has been quite irregular, so much so that the Harewood Mine at Nanaimo, of the Western Fuel Corporation of Canada, was closed down from the end of February until July, and the Pacific Coast Coal Company, which employed a total of 286 employees during 1920, has been idle during the year 1921.

In the Crow's Nest Pass Coal Field the mines have worked steadily, although the periods during which production to the limit of possibilities have not been extended. The Nicola-Princeton Field also has seen considerable activity and some areas have been subjected to development, the results of which promise to be of first importance. It is interesting to note that in the north there are indications that coal mines will be opened up that will further strengthen the position of the Province as a producer of coal, one of the first industrial essentials. A seam is being opened up in the district bordering on the Telkwa River that is described as containing exceedingly high class steam and domestic coal.

Following are the general production figures for 1921 by coal areas, the returns for the month of December being estimates; together with those for 1920 which are given for purposes of comparison:

While from these it will be seen that there is an estimated decrease of 72,000 tons as compared with last year's production it should be remembered that the figures for 1920 are the *corrected figures* and the output submitted for 1921 is likely to be reduced when the annual returns are made.

The most notable differences are in the operation of the following mines:

The Pacific Coast Coal Mine which during 1920 produced 94,000 tons did not operate in 1921.

The Corbin Coal & Coke Co. which produced 147,000 tons in 1920 produced 71,774 tons in 1921, a decrease of over 75,000 tons.

Outstanding above the Granby Consolidated M. S. & P. Co. increased their output from 701,491 in 1920 to 766,817 in 1921 and Coalmont Collieries increased from 298,000 tons in 1920 to 372,689 tons in 1921.

Nanaimo Collieries also increased from 27,000 to 48,500 during the same period.

Regarding the larger operating companies the Crow's Nest Pass Coal Co. have a slightly increased output in 1921 as compared with 1920 while the operations of

ESTIMATED OUTPUT OF COAL FOR BRITISH COLUMBIA DURING 1921.

Assuming that the output for December equal that of November the total output for the Province during 1921 will be 2,624,774 tons as against an output of 2,696,774 tons in the year 1920. By districts the output will be:

	Vancouver Island	East Kootenay	Nicola Princeton & Telkwa
1921	1,633,500 tons	796,500 tons	194,000 tons
1920	1,698,254 tons	811,389 tons	187,130 tons

Vancouver Island District.

	Canadian Collieries						
	Western Fuel	Comox	South Wellington	Extension	Nanaimo	Granby	Pacific Coast
1921	19,000 tons	426,354 tons	82,700 tons	99,856 tons	18,500 tons	266,814 tons	Nil
1920	275,633 tons	455,944 tons	90,389 tons	196,105 tons	27,000 tons	201,489 tons	94,994 tons

East Kootenay District.

	Crow's Nest Pass Coal Co.			
	Coal Creek	Michel	Corbin	
1921	131,686 tons	240,127 tons	71,774 tons	
1920	130,783 tons	426,276 tons	147,944 tons	

Nicola Princeton District.

	Middlesboro	Princeton Coal Co.	Coalmont	Telkwa	Tulameen
1921	73,319 tons	31,886 tons	68,000 tons	19,811 tons	Nil
1920	85,604 tons	32,122 tons	58,000 tons	30,404 tons	100 tons

Canadian Collieries at Extension and the Western Fuel Corporation of Canada, Nanaimo, show a slight decrease.

Optimistic Reports from Northwest District.

Reports of an optimistic character are given of the Northwestern Mineral Survey District, which comprises the mining divisions of Bella Coola, Skeena, Queen Charlotte, Naas River, Portland Canal, Stikine, Liard and Atlin. This section comprises the mining divisions of Bella Coola, Skeena, Queen Charlotte, Naas River, Portland Canal, Stikine, Liard and Atlin. The first there are on the coast and the latter lie behind what is known as the "Alaska strip". Included in the area are properties of Salmon River, Bear River, Alice Arm, and Anyox.

Granby and Premier Mines Make Large Output.

It is estimated that the increase in tonnage mined will amount to about 75,000 tons. The gold output, exclusive of placer which will just about equal last year, will show an increase of approximately 30,000 oz., or about 60 p.c. greater than last year. This is due to the gold production of the Premier Gold Mining Co. The silver yield for this year will be about 1,500,000 oz., or about 125,000 oz. greater than last. This is due entirely to the output of the Premier Mine. The Premier's output of silver will be over a million oz. alone. The copper production will exceed that of last year by nearly 9,000,000 lb., an increase of about 33 p.c., and due altogether to the Granby Company at Anyox.

Notwithstanding the deflation of the prices of metals, the total *value* of the three metals produced in this district, (gold, silver and copper), will be greater than last year. In fact, taking quantities, not values, into consideration, this year's will be the greatest production ever made in this District.

Placer Gold Output.

Conditions in the Northeast Mineral Survey District, within which are the four mining divisions of Omineca, Cariboo, Quesnel and Peace River, have been better than might have been expected.

While but little lode-mineral production was made, a substantial increase in the placer gold output as compared with 1920 is an encouraging sign for the future. With a return to normal market conditions for the different metals a resumption of lode mineral shipments from the District will probably soon take place.

Development of mineral properties was proceeded with in many parts of the District and more prospectors were in the Hills than for some years past. Besides the actual exploratory work of looking for new mineral discoveries much work is done in the course of a season by prospectors on the properties that they own. In done this summer the showings of ore have been impquite a number of instances of work of this nature proved and the general results very satisfactory. There are now in the Northeastern District a considerable number of prospects, carrying a great variety of ores and metals, which should prove attractive to those who are looking for prospects that have some chance of developing into profitable mines.

Placer mining was vigourously prosecuted in the Cariboo and the indications are that the yearly placer gold production of that section will soon again increase to equal that of pre-war years. Particularly interesting is the re-opening of the old *Bullion* mine at Quesnel Forks, which property was at one time the most important hydraulic mine in British Columbia.

Southern District.

The effects of the lack of a strong market are reflected in the situation in the Southern Mineral Survey District which includes the mining divisions of Grand Forks, Greenwood, Osoyoos, and Similkameen. Here the indications are that, as compared with 1920, there will be a drop in the output of the metalliferous mines, although this is offset to an increase in the production of the coal fields. In 1920 the tonnage production of the metal mines of the district aggregated 103,032 and it is estimated that that for 1921 was 26,750. It should be noted that one of the best developed copper mines of the Province is situated in this section, that it is equipped with plant capable of making a substantial daily output, and that it may be expected to be in operation as soon as the market rises to assure satisfactory returns. This concern did not operate during 1921 but the indications are that it will become a steady producer this year. The coal production jumped from 35,533 tons in 1920 to 97,767 tons last year which is an indication that the Nicola Princeton Field is beginning to receive the attention that its possibilities merit.

The prospectors of the district have been confining their efforts generally to searching for gold and high grade silver ores, together with making a careful study of the old Crown Granted Mineral Claims which have reverted to the Government through the non-payment of taxes. Some diamond drilling has been undertaken by outside capitalists on an old group of claims in the Fairview Camp and the results are being awaited with interest.

East and West Kootenay.

With a few notable exceptions the slump in metal prices made it impossible for the mines of the Eastern Mineral Survey District, which broadly speaking comprises East and West Kootenay, to maintain production or at least to continue the work of mining and shipping on the same basis as in the past. However, there is every indication that these affected have grappled with their difficulties courageously, that properties unable for the moment to pay the costs of mining, freighting, treatment, etc., and yield a fair profit have been subjected to systematic development during the period of temporary slackness. Their owners are looking forward to the improvement that the future surely holds with confidence and when it comes—and the signs of its early approach are already at hand—they will be in shape to take the fullest advantage of the changed conditions. The recent healthier tone of the silver market has tended to stimulate mining and create a more optimistic sentiment among the silver-lead operators than existed earlier in the year. Activities of leasers, prospectors and small operators have been on the increase during the past few years and the last year has been no exception to the rule. There has been a decided revival of intrest in gold properties, both lode and placer mining.

Coal Mining in Western District.

As to the Western Mineral Survey District, embracing the Mining Divisions of Alberni, Clayoquot, Nanaimo, New Westminster, Quatsino and Victoria, it is pointed out that, with no production of copper from the Howe Sound Company, the metaliferous output has been ne-

gligible. Coal Mining has been the only phase of the Mining Industry within this area that has been engaged in shipping. However, there has been much prospecting, a number of important West Coast properties have been under development with good results, and the iron ore deposits of the area have been further explored and investigated both as to the quality of the ore and the tonnage available. In this connection under authority of the "Iron Ore Supply Act, 1919" there were shipped during the month of May 502 sacks of Magnetite to Thomas Summerson & Sons Ltd., Darlington, England, for experimental purposes. This ore was taken from the Lake Mine, Texada Island, owned by the Puget Sound Iron Company. A systematic exploration of the minerals of the E. & N. Land Belt, Vancouver Island, also has been in progress under the instructions of the E. & N. Railway Co. The information that will be obtained is designed to facilitate the arrival at an agreement between the Provincial Government and the Railway Company for the elimination of the present objectionable system of dual control of the minerals within the area in question. At present the E. & N. Railway Company is the owner of all coal and base metals within the boundaries of the railway belt, with the exception, of course, of such of these holdings as have been alienated, while the title to previous metals within the belt is vested in the Crown. This condition, it is maintained by the Minister of Mines, has had the effect of retarding the opening up of the mineral wealth of the Island and he has been bending every endeavor to effect an adjustment that will remove the obstacle to free prospecting and unrestricted staking of claims in accordance with the terms of the Mineral and Placer acts.

Construction of roads, trails and bridges.

The policy of extending financial assistance in the construction of roads, trails and bridges to mines, or deserving mineral claims, has been continued in accordance with the terms of the Mines Development Act. This has been done where the resident mining engineers have reported favorably upon applications for aid. That this co-operation by the Mines Department in the development of the mineral resources is appreciated has been indicated in many ways, but, perhaps, the need is best shown by the number of properties, proven to be of merit, that have been helped from the prospect stage to the point of clear demonstration of value by the provision of transportation facilities. From the date of inauguration of this policy to the 22nd March, 1921 there were authorized for expenditure on mines roads and trails $425,015 of which there were expended $378,319. Similar authorizations from the 1st of April 1921 to the 30th December of the year totalled $21,561. In the course of favorable comment on the effects of this phase of the Department's activities a mining man of East Kootenay observes: "Mine trails are the arteries through which flows the life of any mineralized and undeveloped area. An old trail full of windfalls and grown over with underbrush is worse than no trail at all."

Accidents in 1921.

Thirteen fatal accidents occurred in 1921 in connection with the mining industry, ten of which happened in coal and three in metalliferous mining. This is a remarkably fine record in a comparative sense and one of which the Minister of Mines, who has been consistent in his efforts to provide adequate safeguards for the lives of those working underground, is especially proud. The ten coal mine fatalities, figuring on the basis of an employed force of 6,500 in and around coal mines, shows a ratio of 1.54 per thousand as against 2.67 per thousand in 1920 and 2.03 in 1919. The three fatalities in metal mines, placing the number employed at 3,341, gives a ratio per thousand of .9. The latter, however, is not official because the exact number of those engaged in the metaliferous industry during 1921 is not yet available.

When, in 1919, it was reported that there had only been twelve fatal accidents in the coal mines of the Province in that year it was pointed out that the record had never before been equalled in the coal mining history of British Columbia and that it had been paralleled but once in twenty-one years. This was in 1905 but in considering the statistics of that year it must be remembered that there were little more than half as many men employed then in and around coal mines. But, while the record of 1909 was better than any of the past everything considered, that of 1921 stands by itself, a new mark, and the result of stringent regulations, strictly enforced, as well as the earnest co-operation of the coal miners and others directly affected. The same comment applies to the metal mines.

It is worth noting that during the past year the regulation the effect of which has been the removal of practically all flame lamps from the coal mines of the Province has been enforced. The electric lamp, a much safer as well as a better means of illumination, has been introduced and from all reports appears to be most popular.

While, however, no suggestion for the prevention of accident to underground workers has failed to receive the best attention of the Department, it has been recognized that the occupation is a hazardous one and that, as long as there is mining, there are likely to be some mishaps. The endeavor to improve and to keep up to date in point of equipment and efficiency the Mine Rescue Branches has never been allowed to slacken. Much has been accomplished through the training stations established in the different coal mining fields, the action of the collieries in obtaining modern mine rescue apparatus, and in the policy of extending support to competitions in Mine Rescue Work. There are today in the Province over 500 holders of Mines Rescue Certificates granted by the Department to those who have taken a course of training in this work.

Rescue Apparatus and First Aid.

There are installed at the coal and metalliferous mines and Government Stations in the Province 130 sets of Mine Rescue Apparatus, and 15 resuscitating devices. There is one Mine Rescue apparatus for approximately every 10 persons employed underground and one resuscitating device for about every 17 employed underground at Coal Mines. Over [illegible] per cent of the underground employees in Coal Mines in the Province hold Mine Rescue Certificates, and nearly fifteen per cent of the total employees have passed examinations in First Aid Work.

Through its system of [illegible] Department of Mines has been successful in arousing interest in First Aid Work. Training in this work in various mining centres [illegible] resulted in the passing of examinations by over 1200 mine employees. One striking vindication of the attitude of the Government in this worthy form of [illegible] activity is the fact that last year teams representing the Canadian Western Fuel Corporation of Nanaimo and the Crow's Nest Collieries [illegible] won every [illegible] honors in the Canadian National First Aid Competitions under the

pices of the St. John's Ambulance Association. In the Open Contest for the Montizambert Cup, No. 1 Team, First Aid of the Canadian Western Fuel Corporation scored a higher percentage of points than any of its competitors and so obtained the Canadian Championship. In the First Aid Contest for miners' teams, the award being the Coderre Cup, No. 1 First Aid Team, Nanaimo, secured first place while second place went to the Cumberland First Aid Team. In recognition of this splendid performance, the winning teams were awarded special medals by the Department of Mines and the Canadian Championship team was assited to make the trip to St. Louis to compete in the International Competitions where they were among the higest in score and won general laudatory comment.

The standardization of methods of training in the use of Mine Rescue Apparatus, as well as of the instrument itself as far as possible, has been one of the objects of the Minister of Mines for several years. He made the suggestion, following a deplorable fatal occurrence in Washington State Coal Mines, to the United States Bureau of Mines. The result was the calling of an International Conference to discuss the points raised. This took place at St. Louis, Mo., and British Columbia was represented by Andrew Strachan, senior mines inspector. Committees have been appointed to make further investigation and the question is to be further discussed at an early date.

Lecturing to Prospectors and Miners.

Mr. Sloan announced that the policy of having a series of instructional addresses delivered by the mining engineers in their various districts is to be continued during the present winter. These lectures cover rudimentary chemistry, mineralogy, geology as applied to mining, ore deposits, and favourable districts for prospecting.

This programme was carried out during 1920-1921 with very gratifying results. William M. Brewer, whose headquarters are at Nanaimo, travelled from one end to the other of Vancouver Island, lecturing to prospectors and miners in each of the centres. All his meetings were well attended and judging from the comments of those who took advantage of the opportunity, and from the tone of the newspaper accounts of the lectures, Mr. Brewers's talks were very much appreciated as well as being considered of much value to those interested in a practical way in the industry. Much the same may be said as to the results of Mr. P. B. Freeland's winter tour of the Boundary Districts.

In the Kootenays Mr. A. G. Langley, Resident Mining Engineer with headquarters at Revelstoke, in his lectures at Revelstoke, Nelson, Cranbrook and elsewhere was received by large numbers of prospectors. That his instructional addresses were appreciated is conclusively indicated by telegrams, letters and Press comment from various parts of his District. The British Columbia Prospectors' Association of East Kootenay wired from Cranbrook as follows, under date of March 8th, 1921:

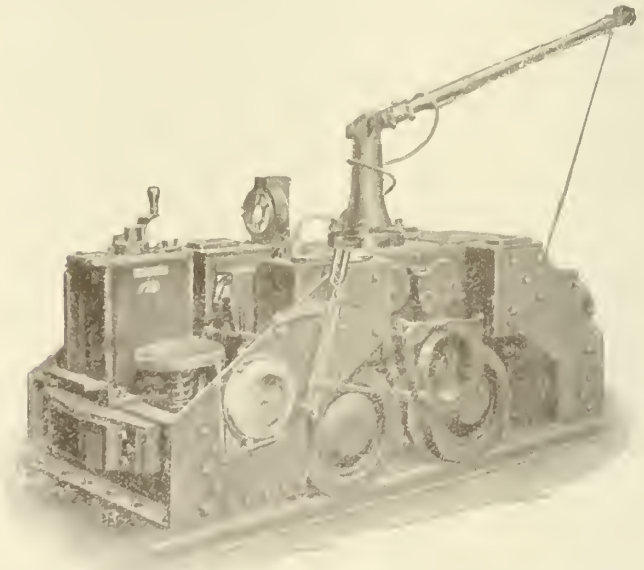
"Mr Langley's initial lecture here last night was most effective, and a second lecture desired as soon as possible."

In the North Mr. J. D. Galloway, Resident Mining Engineer, with headquarters at Hazelton, also delivered simular lectures with equally gratifying results.

Another step taken for the benefit of the prospector and the small mine operator is the granting of a rebate on the cost of powder used in the development of mineral claims. This concession is given under certain conditions which are enumerated in a form available on application to the Mining Recorders in all divisions. The privilege has been largely taken advantage of, is clearly much appreciated, and should be of much assistance to those engaged in the work of proving up mineral properties.

A SHORT LOCOMOTIVE FOR SPECIAL PURPOSE.

At the Hollinger mine electric locomotives are used to haul the ore cars. To avoid delays due to locomotive breakdown it was decided recently to purchase a special locomotive which could be easily moved from level to level in case of need. To enable quick transportation on the man cage, it was required that the locomotive should not exceed 96 inches in length. The gauge being 18 inches and the length being so short a single motor locomotive was decided upon. A 3 ton Goodman single



Goodman Single Motor Locomotive Used at Hollinger Mine.

motor locomotive has been installed as most suitable for the conditions. The one armature of this locomotive is geared to all four wheels, which operate as a single unit, giving a maximum tractive effort per ton of locomotive weight. This locomotive has a 24 inch wheel base, enabling it to negotiate curves of only 8 ft. radius. It has a 30 h.p. motor, giving 10 h.p. per ton of weight, and is admirably adapted to the conditions.

WINTER STAKING AT ELBOW LAKE.

BY REECE H. HAGUE.

The biggest winter rush yet experienced in Northern Manitoba is at present under way when all roads lead to Elbow Lake and every day finds parties of prospectors hiking out to what they dream of as the new El Dorado.

During December 78 claims were recorded at the Lands Office at The Pas, the greater number of them being situated in the Elbow Lake zone, and according to present indications the stakings during January will considerably exceed this total.

The action of the Hollinger interests of Ontario in taking over the Murray claims at Elbow Lake gave considerable impetus to staking in that district and the reports of still other seemingly important finds has added to the excitement.

Racing teams are being utilized for taking prospectors and prospective stakers out to Elbow Lake,

the latest mining men to leave including G. R. Bancroft superintendent of the Mandy Mining Company and Canadian representative of the Tonopah Company. Mr. Bancroft staked several claims and returned to The Pas to record and then hastened back to watch developments, taking with him his train of dogs which finished third in last Year's Pas Dog Derby and which are in training for the forthcoming race.

Walter A. Ukyser, of the London Exploration Co., London, England, left for Elbow Lake on the same day as Mr. Bancroft. Mr. Ukyser, who is a well known mining engineer, is attached to the American office of the London Exploration Co.

Prospectors are leaving the town singly and in groups, as many as seven dog teams having started out in one party. The Hollinger interests have a number of men at work stripping and trenching on the Murray claims, under the supervision of Jack Rutherford, of Porcupine.

A number of properties have been taken up by eastern interests styling themselves the Elbow Lake Mines Ltd., and several small sales have been negotiated in different quarters. Claims in the Elbow Lake region seem to be in fairly good demand and local residents are taking good care to get in on the rush. The majority of the prospectors in Northern Manitoba are at present at Elbow Lake, and the Murray claims is staked for miles. The activity is extending to Copper Lake and Island Lake in the same area where promising finds have been made.

With the advent of spring there should be considerable activity at Elbow Lake as with the heavy snow fall there is little chance of intensified prospecting at present.

It is two and a half years since the Gordon find At Copper Lake, eight miles from Elbow Lake caused considerable stir in mining circles. Mr. Gordon brought some remarkably spectacular samples of free gold into the town, which resulted in considerable staking around Copper Lake.

Late the same season T. Webb made a promising free gold discovery at the north end of Elbow Lake, and attention was directed to that district.

In the meantime Mr Gordon had his big lode diamond drilled and an ore body carrying satisfactory values proved up; but it was decided to temporarily suspend operations until better transportation facilities were available.

Then in June last came the Murray brothers find, and once more interest revived in Elbow Lake. So rich were the samples brought to The Pas that at first it was thought that possibly the Murray brothers had merely struck a rich pocket, but reports of eminent mining engineers who visited the property set this fear at rest.

Mr. Samuel Cohen, who secured the Murray claims for the Hollinger interests, stated that the find was important and that if it would average it was the greatest thing he knew of. He did not attribute the enrichments to secondary or surface deposition. Some of the quartz exposures, Mr. Cohen said were from 10 to 20 feet wide and it was in these that values ranged from the payable to the pyrotechnic. The quartz bunches and veinlets, or stringers, lay that. This condition might continue with the varying result characteristic of such occurrences. At any rate he said the find was important and deserved the treatment it would receive.

The anticipated construction of a railway to the Flin Flon property will be of vast importance to the Elbow, Copper and Island Lake districts. From where this line will cross Cranberry Portage, eighty miles from The Pas, there is a good water route to all these areas and the distance is short.

Properties in the Athapapuskow Lake district will also be opened up by this railway and it is being advocated that construction of the line to Cranberry Portage be commenced immediately and that it be continued on to Flin Flon as soon as the Canadian Mining Corporation is prepared to commence operations on this enormous copper body.

TORONTO MINING QUOTATIONS.

	High	Low	Last
SILVER			
Adanac Silver Mines, Ltd.	1½	1	1½
Bailey	33/8	23/8	23/8
Beaver Consolidated	24½	18	22
Crown Reserve	16	10	15
Foster	1½	1½	1½
Gifford	1	3/4	1
Great Northern	3	1¼	1¾
Hargraves	1	1	1
La Rose	34	32	33
McKin.-Dar.-Savage	15¾	14½	15
Mining Corp. of Can.	1.06	1.01	1.05
Nipissing	7.25	6.65	6.80
Ophir	1½	1	1
Peterson Lake	5¼	4¾	5
Right of Way	1½	1½	1½
Silver Leaf	1	1	1
Temiskaming	31¼	25	30½
Trethewey	7½	5¾	6½
GOLD			
Atlas	13½	7	11½
Apex	5	1	1¾
Boston Creek Mines	4	7	4
Dome Extension	80	75	75
Dome Lake	5¾	5	5⅜
Dome Mines	23.00	19.70	22.35
Gold Reef	21/8	1¼	1⅞
Hattie Gold M. Ltd.	20	20	20
Hollinger Cons.	8.00	7.74	7.97
Hunton Kirkfd. G. M.	64	64	64
Inspiration	3	2	2½
Keora	10¾	9	9½
Kirkland Lake	37	27	29½
Lake Shore M. Ltd.	1.37	1.20	1.35
McIntyre	3.35	3.10	3.18
Moneta	11	7½	11
Newray Mines, Ltd.	6¼	1⅝	5½
Porcupine Crown	14	12	13
Porcupine Imperial	⅝	1	1
Porcupine Tisdale	1	1	1
Porcupine V. N. T.	20	17½	19½
Preston East Dome	3	2¾	2⅞
Schumacher	35	31	31
Teck Hughes	71	1.50	65
Thompson Krist	2½	1½	1½
West Dome	16¾	15½	15½
West Tree Mines Ltd.	2⅝	1	2
Wasapika Con.	¼	¼	¼
MISCELLANEOUS			
Bothwell Oil	13¾	11	11
Federal Oil, Pfd.	18½	10	10½
Rockwood Oil Gas	1½	1½	1½
Vacuum G.	4¼	3	3

Northern Ontario Letter

THE SILVER MINES

Greatly reduced costs of producing silver as shown in the statement of the Coniagas Mines for the fiscal year ended October 31st has given rise to the belief that a number of the other mines which are lying idle may now be operated profitably. Among these would be the Beaver Consolidated and the Temiskaming, and it is believed that with the arrival of warm weather in the spring these mines may be again numbered among the active operations.

McKinley-Darragh.

There is evidence that certain New York brokers are making an effort to induce stockholders of the McKinley-Darragh to send in their shares for exchange in some other unknown concern, apparently with the object of winning a place of influence in the affairs of the McKinley-Darragh. It is reported that these brokers are sufficiently ambitious to possibly make a bid for control of the company. The impression seems to be, however, that in spite of the stock of the McKinley-Darragh being distributed among an exceptionally large number of stockholders that the scheme now on foot will be a success only should the directorate of the McKinley wish it to be so, and this is considered to be entirely unlikely.

Trethewey.

A meeting of the Trethewey-Cobalt is to be held Jan. 19th for the purpose of considering the question of incorporating a new company, some of the details of which were outlined in the Journal last week. It is planned to incorporate another company with an authorized capitalization of 2,000,000 and to issue one of the new shares for each of the 1,600,000 now outstanding. This would leave the company with 1,600,000 shares in its treasury which would be marketed with a view to securing funds with which to pay off the indebtedness of something like $40,000 as well as to provide working capital.

Cane Silver.

It is now considered doubtful about the Hudson Bay Mines going into the Cane Silver Mines in Cane township on the Elk Lake branch of the T. and N. O. Railway. Certain of the interested parties in the company paid a visit to the property during the past week.

Crown Reserve.

The Crown Reserve is going ahead with plans to erect a mining plant on property in the Larder Lake district in which it is interested. The gold content of the ore on this new property is such as to encourage the belief that it may develop into a commercial proposition, and shareholders are watching this new venture with interest.

Nipissing produced 3, 100,000 oz.

During the year 1921, according to the regular monthly statements for the period, the Nipissing mine produced approximately 3,100,000 ounces of silver. Of this amount, about 1,115,000 ounces was accounted for during the closing three months of the year. Development during the year proved numerous veins to carry ore beyond their previously known limits, while a number of new veins were also discovered.

South Lorrain.

A meeting was recently held of stockholders and interested parties of the old Maidens property in South Lorrain, and it was believed advisable to consider the question of incorporating a new company with a view toward placing a substantial number of shares in the treasury with which to endeavor to raise finances for general operating expenses. The property has always been regarded as a promising prospect and is one that attracted considerable attention in the early days of activity in the South Lorrain district. By reason of the success on the Keeley Silver Mines, new interest is being turned in that direction.

While the Keeley mine itself is occupying the centre of greatest interest in South Lorrain, yet the somewhat similar geological conditions on the Haileybury-Frontier and the intention of the Mining Corporation of Canada to explore that part of the Frontier property where occurs the line of weakness which passes over the Keeley onto the Frontier is regarded as of extreme importance.

Gowganda mine produces five million ounces silver.

Steady production is being maintained by the Miller Lake-O'Brien mine at Gowganda, which property now has a production record of over 5,000,000 ounces of silver to its credit since the discovery of the first important deposit of ore in 1912. This company makes regular shipments of high grade ore as well as concentrates.

Triangle.

An effort is being made to raise money with which to re-open the Triangle property, situated in the township of Auld in the Elk Lake Mining Division. This property was originally known as the Kenabeek Silver Mines and later was changed to the Kenabeek Consolidated, after which it went into liquidation and became known later as the Triangle. More or less silver occurs on the property, a shaft having been put down to a depth of about 200 feet, and with a first class mining plant installed.

Bailey Leases Silver Cliff.

During the month of December the Bailey Customs mill realized gross earnings of $11,488.97, the mill having treated a total of 3,827 tons of ore. The Bailey mine itself contributed 1,160 tons. A feature of the regular monthly statement was confirmation of the announcement made recently in the Journal that the Bailey had taken a lease on the old Silver Cliff mine. It is stated that 247 tons of ore were taken from the Silver Cliff during December and that upwards of 8,000 tons of ore lie in the stopes.

Nipissing in December.

The Nipissing maintained its extremely favorable production record throughout the month of December, when the output amounted to 365,700 fine ounces of silver and $13,755 worth of cobalt, making a total value of $251,467 for the period.

Development work proved the mineralization to extend beyond its previously known limits, the following

The Canadian Miners' Buying Directory.

Acetylene Gas:
Canada Carbide Company, Ltd
Preet-O-Lite Co. of Canada, Ltd.

Acetylene Welding:
The Toronto Iron Works, Ltd.

A.C. Units:
Powley & Townsley, Limited.

Agitators:
The Dorr Co.
Can. Chicago Bridge & Iron Co., Ltd.
Horton Steel Works, Limited.

Air Compressors:
Bellliss & Morcom, Ltd.
Laurie & Lamb

Air Hoists:
Canadian Ingersoll-Rand Co., Ltd
Mussens, Limited.

Air Receivers:
The Toronto Iron Works, Ltd.

Alloy and Carbon Tool Steel:
Peacock Brothers Limited.

Alternators:
MacGovern & Co.

Aluminium:
Spielman Agencies, Regd.

Amalgamators:
Northern Canada Supply Co.
Mine and Smelter Supply Co.
Wabi Iron Works.

Antimony:
Canada Metal Co.

Antimonial Lead:
Pennsylvania Smelting Co.

Assayers' and Chemists' Supplies:
Dominion Engineering & Inspection Co
Lymans, Limited
Mine & Smelter Supply Co.
Pennsylvania Smelting Co.
Stanley, W. F. & Co., Ltd.

Ash Conveyors:
Canadian Link-Belt Company

Ashes Handling Machinery:
Canadian Link-Belt Co., Ltd.

Assayers and Chemists:
Milton L. Hersey Co., Ltd.
Campbell & Deyell
Ledoux & Co.
Thos. Heys & Son
C. L. Constant Co.

Asbestos:
Everitt & Co.

Balls:
Hull Iron & Steel Foundries, Ltd
Peacock Brothers Limited,
The Wabi Iron Works.
The Hardinge Conical Mill Co
The William Kennedy & Sons, Ltd.

Ball Mills:
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd
The Wabi Iron Works.
The William Kennedy & Sons, Ltd.

Babbit Metals:
Canada Metal Co.
Hoyt Metal Co.

Ball Mill Feeders:
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd

Ball Mill Linings:
Hardinge Conical Mill Co
The William Kennedy & Sons, Ltd.
Peacock Brothers, Limited
Hull Iron & Steel Foundries, Ltd

Belting—Leather, Rubber and Cotton:
Canadian Link-Belt Co., Ltd.
The Mine & Smelter Supply Co
Northern Canada Supply Co.
Jones & Glasco.

Belting:
R. T. Gilman & Co
Gutta Percha & Rubber, Ltd

Belting—Silent Chain:
Canadian Link-Belt Co., Ltd
Hans Renold of Canada, Limited, Montreal.
Jones & Glassco (Regd.)

Belting (Transmission):
Goodyear Tire & Rubber Co

Belting (Elevator):
Goodyear Tire & Rubber Co

Belting (Conveyor):
Goodyear Tire & Rubber Co
Gutta Percha & Rubber, Ltd.

Bins and Hoppers:
The Toronto Iron Works, Ltd.
Can. Chicago Bridge & Iron Co., Ltd.
Horton Steel Works, Limited.

Blasting Batteries and Supplies:
Canadian Ingersoll-Rand Co., Ltd
Mussens, Ltd.
Canadian Explosives, Ltd.
Powley & Townsley, Limited.

Bluestone:
The Consolidated Mining & Smelting Co
The Coniagas Reduction Co., Ltd.

Blowers:
Canadian Fairbanks-Morse Co., Ltd
Northern Canada Supply Co.

Boilers:
Canadian Ingersoll-Rand Co., Ltd
Marsh Engineering Works
R. T. Gilman & Co.
The John Inglis Company
Wabi Iron Works.

Blue Vitriol (Coniagas Red):
Canadian Fairbanks-Morse Co., Ltd

Bortz and Carbone:
Diamond Drill Carbon Co.

Boxes, Cable Junction:
Standard Underground Cable Co. of Canada, Ltd
Northern Electric Co., Ltd.

Brazilian Rough Diamonds:
Diamond Drill Carbon Co.

Brazilian Mica:
Diamond Drill Carbon Co.

Buggies, Mine Car (Steel)
Hendrick Manufacturing Co

Brazilian Ballas:
Diamond Drill Carbon Co.

Brazilian Rock Crystal:
Diamond Drill Carbon Co.

Brazilian Tourmalines:
Diamond Drill Carbon Co

Brazilian Aquamarines:
Diamond Drill Carbon Co.

Bridges—Man Trolley and Rope Operated—Material Handling
Canadian Mead-Morrison Co., Limited

Bronze, Manganese, Perforated and Plain:
Hendrick Manufacturing Co.

Buckets:
Canadian Ingersoll-Rand Co., Ltd
R. T. Gilman & Co.
Hendrick Manufacturing Co
Canadian Link-Belt Co., Ltd.
Marsh Engineering Works
Mussens, Ltd.
MacKinnon Steel Co., Ltd
Northern Canada Supply Co.
The Wabi Iron Works

Buckets, Elevator:
Canadian Link-Belt Co., Ltd
Hendrick Mfg. Co
Peacock Brothers Limited.

Cable—Aerial and Underground:
Canada Wire & Cable Co.
Northern Canada Supply Co
Standard Underground Cable Co. of Canada Ltd
Peacock Brothers, Limited

Cableways:
Canadian Mead-Morrison Co., Limited
Fraser & Chalmers of Canada, Ltd
Mussens, Ltd.
The Wabi Iron Works
R. T. Gilman & Co

Cages:
Canadian Ingersoll-Rand Co., Ltd Montreal Que
Northern Canada Supply Co
Fraser & Chalmers of Canada, Ltd
The Electric Steel & Metals Co
The Mine & Smelter Supply Co
Mussens, Ltd.
The Wabi Iron Works

being the regular monthly statement from Hugh Park, manager, to the president and directors:

"During the month of December the company mined ore of an estimated net value of $251,467 and shipped bullion from Nipissing and custom ores of an estimated net value of $204,869. The value of the month's silver production was estimated at 65 cents per ounce.

"There were no unusual developments underground. Development work on some small veins at the first and ninth levels of 73 shaft was productive of good results. Additional ore was also developed at vein 61.

"Sinking from the second level on vein 251 at the 63 shaft is now under way. The winze was down 38 feet at the end of December and has shown two or three inches of ore assaying several thousand ounces of silver per ton all the way.

"The 128 shaft has been de-watered and further exploration will be done in the surrounding area. This shaft was flooded at the time of the labor strike two years ago and was allowed to remain so. About 500 feet of exploration had been done at the 125 foot level, without favorable results. A new level will be established at 75 feet.

"The low grade mill treated 6,631 tons. The high grade plant treated 199 tons. The refinery shipped 302,833 fine ounces of bullion. The following is an estimate of the net production for the month of December:

Silver production	$237,712
Cobalt	13,755
	$251,467

THE GOLD MINES.

Wage Reduction.

At the time of writing, the wage reduction of six cents an hour promises to go into force at the end of this month without any opposition at the Hollinger mine. This promises to save the company about $300,000 annually, and will be a big factor in making up for the "loss" in income resulting from the lower rate of exchange on United States funds.

Exploring Rochester under option.

Reports were current this week that the Nipissing had exercised its option on the Rochester property, adjoining the Hollinger and that shaft sinking would commence immediately. It has been learned however by the Journal that the working option holds good for the balance of the winter and the Nipissing is still pursuing an exploration policy. Results have been encouraging as was announced exclusively in these columns recently.

Hollinger Shareholders.

Directors and their immediate friends hold approximately 75 per of the shares of the Hollinger Consolidated according to official advice. This fact has had a good influence on favorable sentiment toward the security.

McIntyre Prospering.

With regard to the McIntyre-Porcupine, apart from the exceedingly favorable results on the mine, and the prospects of production being increased by another million dollars early in the coming summer, it has been learned that good reports are coming from Alberta and that the coal mining enterprise in which the company is involved promises to be self-sustaining, and has the appearance of being likely to develop into a big asset.

Moneta.

Reports are current that the Moneta-Porcupine may figure in a deal of importance and that one of the leading mining companies is anxious to become interested in a scheme to re-open the property, owing to the strike of the ore bodies of the adjoining Hollinger being in that direction.

Dome.

Development work on the Dome continues to strengthen the physical condition of the mine, a feature being that the high grade sections have to be left for the present until suitable milling arrangements may be made. This situation holds out big promise for the future and seems to assure the Dome of a high average grade of ore for some time to come. In the meantime the mill is operating at full capacity on ore of the high average of between $7 and $8 per ton.

Davidson.

Mr. Hugh Sutherland, identified with the Davidson mine, was in the district during the past week and was optimistic in regard to the future. Mr. Sutherland is also identified with a scheme to develop hydro-electric energy in the Fort Matachewan district on the Montreal River at a point about 50 miles south-east of the Porcupine district. As to whether, the scheme is assured of the necessary finances has not been ascertained at the time of writing.

The Light Railway.

A wave of criticism has recently developed against the Canadian Light Railway Construction Company, a concern with an office at Swastika and which planned to construct light lines toward the east and west to the outlying mining areas. It has been alleged that men have had to go without their pay and that severe hardship has been experienced. No grading has been done and no rails appear to have been purchased and the whole scheme seems to have developed into a "cropper."

Teck-Hughes.

Ore being treated at the Teck-Hughes Gold Mines has recently averaged well above the average during 1921. It is understood that production for a period of a few days was upwards of $15 per ton of ore going through the mill. Now that the bonded indebtedness has been greatly reduced, and owing to the sound physical condition of the mine, the Teck-Hughes is believed to be on a fair way to completely retire the bonds against it and to in due time win a place among the dividend paying mines.

Kirkland Lake Proprietary.

Detailed official advice to the representative of the Journal goes to show that the Kirkland Lake Proprietary (1919) Ltd., is on a fair way to achieve its objective and to place the merged Tough-Oakes and Burnside mines on a profitable basis of operation.

Ore is being opened up at a depth of 400 feet on the Burnside in the "main break" along which the important gold producers are producing their ore. Assays range from $10 to upwards of $20 per ton and the management anticipates no difficulty in being able to establish millheads of between $11 and $12 to the ton.

A feature of present operations is that shaft No. 3 on the Burnside is being converted into the central shaft. A double-drum electrical hoist is now in course of installation and arrangements are being made to instal

Canadian Miners' Buying Directory.—(Continued)

Cables—Wire:
Standard Underground Cable Co of Canada Ltd
Canada Wire & Cable Co.
R. T. Gilman & Co.

Cable Railway Systems:
Canada Wire & Cable Co.

Cam Shafts:
Hull Iron & Steel Foundries, Ltd.
Peacock Brothers Limited.

Car Dumps:
Sullivan Machinery Co.
R. T Gilman & Co.

Carbide of Calcium:
Canada Carbide Company, Ltd.

Cars:
John J. Gartshore
MacKinnon Steel Co., Ltd.
Northern Canada Supply Co.
Marsh Engineering Works
Mine and Smelter Supply Co.
Peacock Brothers, Limited
Mussens, Limited
Powley & Townsley, Limited.
R. T Gilman & Co.

Car Wheels and Axles:
Canadian Car Foundry Co., Ltd.
Burnett & Crampion
Hull Iron & Steel Foundries, Ltd
John J. Gartshore
Marsh Engineering Works, Ltd.
Peacock Brothers Limited.

Carriers (Gravity):
Jones & Glassco

Castings—Brass
The Canada Metal Co., Ltd

Castings (Iron and Steel)
Hull Iron & Steel Foundries, Ltd
Peacock Brothers Limited.
The William Kennedy & Sons, Ltd.

Cement Machinery:
Hadfields, Limited
Hull Iron & Steel Foundries, Ltd.
Burnett & Cramptor.

Chains:
Jones & Glassco
Northern Canada Supply Co.
Canadian Fairbanks-Morse Co., Ltd
Canadian Link-Belt Co., Ltd
Greening, B., Wire Co., Ltd

Chain Drives:
Jones & Glassco (Regd.)

Chain Drives—Silent and Steel Roller:
Canadian Link-Belt Co., Ltd
Hans Renold of Canada, Limited, Montreal, (
Jones & Glassco) Regd.).

Chemical Apparatus:
Mine and Smelter Supply Co
Powley & Townsley, Limited

Chemists:
Canadian Laboratories
Campbell & Dayell
Thos Hayes & Sons
Milton Hersey Co.
Ledoux & Co
Constant, C. L. Company

Chrome Ore:
The Electric Steel & Metals Co
Everett & Co.

Classifiers:
Mine and Smelter Supply Co
Mussens, Limited
Fraser & Chalmers of Canada, Ltd
The Wabi Iron Works
R. T Gilman & Co.
The Dorr Company

Clutches:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal, (

Coal:
Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutters:
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd
Peacock Brothers, Limited

Coal Crushers:
Canadian Mead-Morrison Co., Limited
Canadian Link-Belt Co., Ltd
Peacock Brothers Limited

Coal Mining Explosives:
Canadian Explosives, Ltd
Giant Powder Company of Canada, Ltd

Coal Mining Machinery:
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd
Canadian Ingersoll-Rand Co., Ltd.
Sullivan Machinery Co.
Marsh Engineering Works
Hadfields, Ltd.
Hendrick Mfg. Co.
Powley & Townsley, Limited.
Mussens, Limited

Coal and Coke Handling Machinery
Canadian Link-Belt Co., Ltd.
Powley & Townsley, Limited.

Coal Pick Machines:
Sullivan Machinery Co.

Coal Screening Plants:
Canadian Link-Belt Co., Ltd.

Cobalt Oxids:
Coniagas Reduction Co.
Everitt & Co.

Compressors—Air:
Smart-Turner Machine Co.
Canadian Ingersoll-Rand Co., Ltd
Mussens, Limited
Peacock Brothers, Limited
The Mine & Smelter Supply Co

Concrete Mixers:
Gould, Shapley & Muir Co., Ltd
MacGovern & Co., Ino
Mussens, Limited

Condensers:
Smart-Turner Machine Co.
Northern Canada Supply Co.
Belliss & Morcom, Ltd.
Laurie & Lamb
Peacock Brothers, Limited

Concentrating Tables:
The Mine & Smelter Supply Co.
Deister Concentrator Co.

Converters:
Northern Canada Supply Co.
MacGovern & Co., Inc.

Conveyors—McCaslin Gravity Bucket:
Canadian Mead-Morrison Co., Limited

Contractors' Supplies:
Canadian Fairbanks-Morse Co., Ltd.

Consulters and Engineers:
Hersey Milton Co., Ltd.

Conveyors:
Canadian Link-Belt Co., Ltd.
The Mine & Smelter Supply Co.
Jones & Glassco (Regd.)
Powley & Townsley, Limited.

Conveyor Belts:
Gutta Percha & Ruhber, Ltd.

Conveyor Flights:
Canadian Link-Belt Co., Ltd.
Hendrick Mfg. Co., Ltd.

Conveyor—Trough—Belt:
Canadian Link-Belt Co., Ltd.
Hendrick Mfg. Co.
Mussens, Limited
Jones & Glassco (Roller, Belt and Chain)
Hendrick Mfg. Co.

Conical Mills:
Hardinge Conical Mill Co.

Copper:
The Canada Metal Co., Ltd.
Consolidated Mining & Smelting Co

Couplings:
Hans Renold of Canada, Limited, Montreal, (

Cranes:
Canadian Mead-Morrison Co., Limited
Canadian Link-Belt Company
Peacock Brothers, Limited
R. T. Gilman & Co.
Smart-Turner Machine Co

Crane Ropes:
Allan Whyte & Co.
Canada Wire & Cable Co.
Greening, B., Wire Co., Ltd.
Peacock Brothers, Limited

Crucibles:
The Mine & Smelter Supply Co.

Crusher Balls:
Canada Foundries & Forgings, Ltd
Hull Iron & Steel Foundries, Limited Hull Que
Osborn, Sam'l (Canada) Limited
Peacock Brothers, Limited
Swedish Steel & Importing Co., Ltd

Crushers:
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd
Hardinge Conical Mill Co.
Lymans Ltd
Mussens Limited
Osborn, Sam'l (Canada) Limited
The Electric Steel & Metals Co., Ltd
R. T Gilman & Co.

[illegible] at this point. From the crushers, the ore will be conveyed by belt-line conveyor up into the mill building on the Burnside and will be deposited in a 250-ton bin. From this point, an aerial tramway will be erected to the Tough Oakes mill and will carry the ore to that point for treatment.

With regard to development work, arrangements have been made to continue the central shaft another 150 feet in depth and to open up the downward continuation of the ore-body which is rapidly placing the enterprise in a strong physical condition.

A force of about 60 men are already on the pay-roll and underground operations are proceeding at the rate of upwards of 500 feet per month. Heretofore five machines have been in operation and a fifth was added this week.

Work is proceeding in connection with placing the mill in shape for resuming general operations in the early spring. The plant will treat from 110 to 120 tons of ore daily and may possibly be brought up to 140 tons daily before the end of the summer.

Goldfields.

The annual meeting of the Canadian Associated Goldfields, Ltd., will be held in Toronto today to receive the statement and the report of the directors and auditors for the ensuing year.

George MacKay, president, makes this statement:

"The directors have pleasure in submitting the balance sheet of your company as at October 31st, 1921, showing cash and Victory bonds on hand, $614,630, development and office expenses $140,177.

"Mr. George Gray, our engineer on the property, who has been in charge since January last, will not have his report on the properties ready for about three months, after which time a meeting of the shareholders will be called and a full report presented."

A financial statement will be presented today which will show assets of $21,953,603, the outstanding item of which is $20,985,398, which appears under the heading of "Mining Properties, including development, timber limits and power rights at Raven Falls and Windego, at value at which acquired from vendors (satisfied in part by the issue of capital stock.)"

The other big item is cash and bonds as referred to by the president.

The company is capitalized at $30,000,000 made up of 30,000,000 shares of the par values of $1 each, and the liability column shows issued trust receipts for 21,934,096 shares of $1 each, fully paid, $21,934,096.

METAL QUOTATIONS.

(From our Toronto Correspondent)

Non-ferrous metals, less than car lots. Toronto, Jan. 18th:

	Cost per lb.
Copper, Electrical	18
Copper, Electrolytic	18
Tin	38½
Lead	7
Zinc	7½
*Aluminum	23
Antimony	9

* Due to foreign metal coming on the market price of this metal is depressed.

The general situation is rather buoyant and there is a feeling of greater freedom in buying.

ACCIDENTS IN ONTARIO MINES

During the year 1921, at all the mines, metallurgical works, quarries, clay sand and gravel pits regulated by the Mining Act of Ontario, there were 1286 accidents reported to the Department of Mines up to January 10, 1922. Twenty-four of these accidents were fatal.

Four fatal accidents at the quarries were due to carelessness or ignorance in the handling of explosives and of the three fatal accidents at gravel pits, two were due to undermining and the third to material falling from a face which was 16 feet in height. A knowledge of explosives and a strict observance of the Mining Amendment Act would have prevented all these accidents.

PERSONAL AND GENERAL

Mr. H. P. De Pencier, manager of Dome Mines, is in Toronto this week.

The Toronto branch of the Canadian Institute of Mining and Metallurgy will hold a meeting Saturday, Jan. 21. One of the subjects for discussion will be "Iron Ore of Ontario".

The Toronto branch of the Association of Women of the Mining Industry will hold a meeting on Friday Jan. 20 at the residence of Mrs. W. E. Segsworth.

The annual Meeting of the Engineering Institute of Canada will be held in Montreal, Jan. 24-25.

The Annual Meeting of the Canadian Institute of Mining and Metallurgy will be held in Ottawa, Mar. 1-3.

Mr. C. R. McLaren has been appointed underground superintendent at the Kirkland Lake Gold Mine. Mr. McLaren was formerly superintendent at the Magpie iron mine which is now not being operated.

THE BRITISH GOVERNMENT

(Department of Overseas Trade)
Announces that the eighth annual

BRITISH INDUSTRIES FAIR

will be held at

LONDON and BIRMINGHAM

from
27th FEBRUARY to 10th MARCH, 1922.

All Canadian buyers are cordially invited to attend.
A particularly fine and comprehensive range of

MINING, COLLIERY AND QUARRYING PLANT

will be shown in addition to many other lines of manufactured goods.

Goods can be examined, values compared and contracts concluded at the Fair with the minimum of trouble and the greatest saving of time.

Full information and complimentary admission cards are obtainable from —

H. M. SENIOR TRADE COMMISSIONER,
248 St. James St., Montreal.

H. M. TRADE COMMISSIONER,
260 Confederation Life Building, Toronto.

H. M. TRADE COMMISSIONER,
610 Electric Railway Chambers, Winnipeg.

EDITORIAL

IRON ORE MINING

According to the "Iron Trade Review" business in the iron ore mining districts will be very much better this year than last. During 1931 the Lake Superior district produced 22,735,726 tons (net ton or little under that one takes the normal output which is around 60,000,000. It is predicted that production this year will be about 40,000,000 tons. Lower freight rates are expected and lower prices will doubtless prevail.

Such predictions are interesting in that they doubtless based on some knowledge of the anticipated needs of furnace operators. If fulfilled, the iron mining will benefit largely and a big step will have been made toward recovery from the depression.

While we have no operating iron mines in Canada just now the increasing demands for ore are of interest to owners of iron mines and prospects. There is at present little incentive to develop iron mines and development here can be expected only when there is a better market for ore than there is now.

GOOD ORE AT DEPTH

The December output of the Lake Shore mine was a notable one. There was recovered $70,454 in gold during the month, which is the best performance yet. The ore treated averaged over three five dollars per ton.

The Lake Shore reports, coupled with recent reports from other gold mines at Kirkland Lake and Porcupine, will help to dispel the impression that was made by early attempts at gold mining in Ontario and increase confidence in the future of gold mining in this Province. Those who are familiar with the facts have good reason to be optimistic. There have been few cases where a gold mining enterprise has been undertaken in Ontario that the results of development have not been at least as good as the earliest showings indicated. There have of course been many small shoots of high

ed One cannot satisfactorily demonstrate the quality and extent of an entire gold deposit until the ore has been all mined and milled We cannot be reasonably sure of either the downward or lateral extent or the contained values of any ore deposit not completely developed. And yet from the ascertainable facts we may have reason to believe that the most important asset of a particular mine is the ore not yet developed, or only partially developed. Having watched developments in Northern Ontario gold areas we have confidence in the future, a confidence that is based on the known facts, but which more particularly has reference to facts yet unknown. In other words we are led by the result of operations to believe that gold deposits of Ontario can be made to yield gold for many years at a higher rate of production than the present.

Even if we should assume with our New York contemporary that the mines were approaching exhaustion and that the outlook was as gloomy concerning new discoveries, there are known facts which assure us that even under such circumstances gold production will be increased. The known ore is in any case to be mined in larger quantity during the coming year. Capacity of plant has been recently increased and is being increased. Production will certainly be increased this year and next year it will be largely increased. If owing to any unforeseen circumstances this does not happen, it will not be because of lack of ore.

Our own opinion, and statements concerning ore yet undeveloped must be considered as expressions of opinion, is that the determined facts indicate that very much more ore than has yet been developed will be found in the mines now producing and that many new mines will be developed. There have been many pleasant surprises for those who undertook to develop the mines at Porcupine and Kirkland Lake and the most important of these has been the finding of better ore at depth than near the surface. It must not be concluded that surface indications were lacking, for there was good ore at surface on most of the properties; but it is quite proper to say that results have been better than was expected and that there is much more ground for hope in the results of future development than there was in the early days of mining at Porcupine.

We are optimistic with regard to the future of gold mining in Ontario and not without reason. While quite unable to demonstrate how much ore will be found, we are nevertheless of the opinion that it will not be the fault of the ore deposits if gold is not produced in very much larger quantities during the next generation. Enterprising men,willing to venture where there is a fair chance of success, will find in Canada plenty of opportunity to develop mineral deposits.Our future production will depend not only on the size and quality of our ore deposits, but on the men who undertake mining enterprises. The men who have made the mines in this country must realize that their opinions concerning the unknown facts were quite as important as the determination of the ascertainable facts. The results of operations during the past ten years have given such men more reason for holding favorable opinions.

OUR IRON RESOURCES

At last Saturday's meeting of the Toronto branch of the Association for the Advancement of Science, there was read a paper by Mr. R. H. Flaherty on our Iron Resources. Mr. Flaherty who is an authority on iron ore deposits and who knows the iron ore ranges south and north of Lake Superior better than most men is quite optimistic over the possibilities of establishing an iron mining industry in Ontario. Such a thing is much to be desired; but there is in many quarters little confidence that it can be accomplished unless assisted to some extent during the early years of the industry.

It would appear from Mr. Flaherty's paper that the possibilities are greater than is generally believed.

It has been pointed out that one of the difficulties encountered in using our carbonate ores is the increased cost of coal. This is a serious matter because the process was devised when coal was cheap and the necessary use of large quantities of fuel was not such a burden when the process was decided upon.

Similarly in other cases there is a possibility that process suited to the conditions may be found and that we may yet use our iron ores to advantage.

UTILIZATION OF LIGNITE COAL

On another page will be found some account of the work being done in Dakota by Dr. E. J. Babcock, on carbonizing lignite. The results being obtained from investigations in Dakota are of interest in Western Canada, where in addition to an abundance of high grade coal there are large deposits of lignite coal. These lower grade fuels, while in the raw state not comparable with the coals that are mined in Western Alberta, can be made into excellent fuel by carbonization and briquetting. To do the beneficiation economically is the problem that Dr. Babcock has been working on, and it is interesting to note that he has made good progress, and that the University of North Dakota and the U. S. Bureau of mines are cooperating in carrying on investigations to find the type of carbonizer most suitable for the process.

A USEFUL VOLUME

We have just received from the Department of Mines, Ontario, a very useful volume. It is a general index to the reports published by the Bureau of Mines in the twenty five years 1891 to 1916. Everyone interested in mining in Ontario has found the reports of the Bureau to contain much valuable information.

Consequently this volume which will serve as a key to the contents of the reports issued during a period of twenty five years is sure to be warmly welcomed.

The compilation of the index was largely the work of Mr. Frank J. Nicolas. Mr. H. Mortimer-Lamb completed the work when Mr. Nicolas went overseas. Mr. P. A. Jackson and Mr. W. R. Rogers of the Bureau read the revised galley proofs and Mr. Rogers read the page proofs and ran the Index through the press. An index prepared in this manner may confidently be expected to be unusually accurate.

Among the important matters to be considered in preparing a general index to reports covering several years is the fact that many new townships have been surveyed, new districts formed and boundaries of districts changed. The index not only helps one to find the reports on subjects and places, but assists in location in accordance with the present geography of the province.

Many of our readers have had occassion to hunt up all the printed references to a mine. With the aid of the index all the Bureau's references to a mine can be very readily found. Similarly all the references to a place or district can be quickly found. The advantages of using such a compilation of data are obvious.

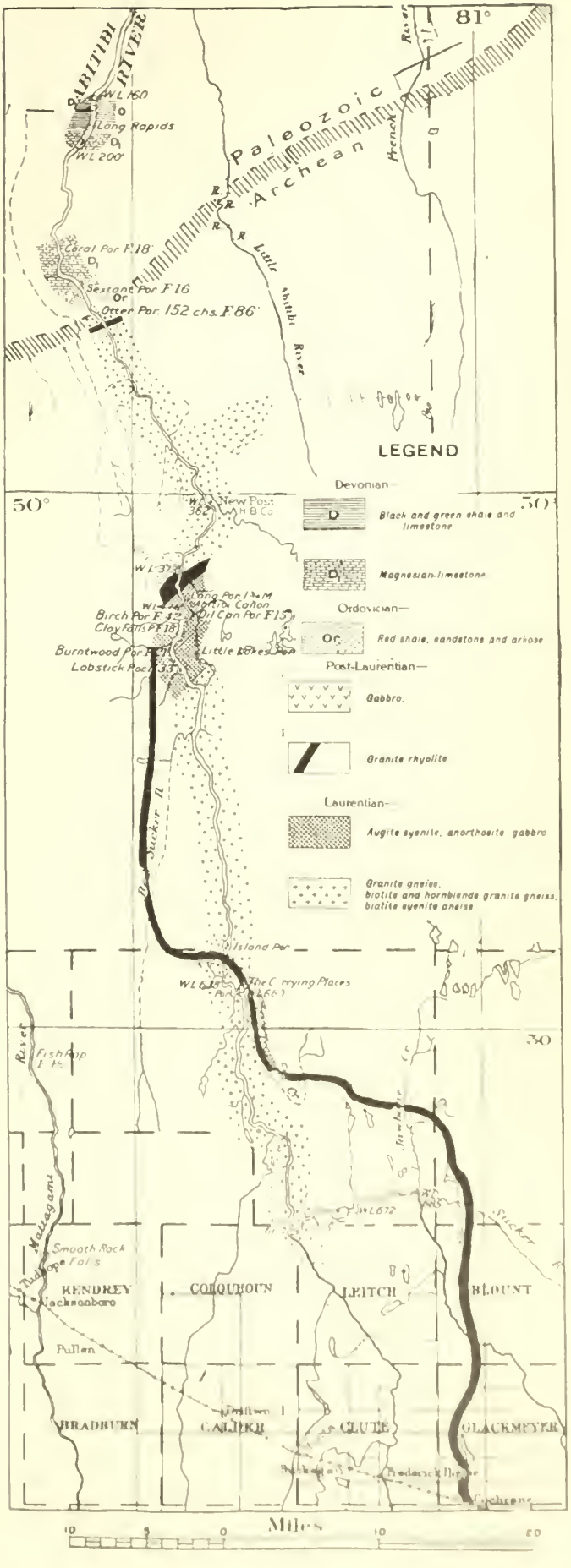
Interesting features of the volume are the map showing the countries and districts of the Province as at present constituted, and the geological sketch map of Ontario showing the areas of pre-Cambrian rocks. With the maps are presented a few facts about Ontario which are worth noting. During the period covered by the index the mineral production of the Province increased from $4,705,672 to $65,303,822.

The index is well printed on good paper and well bound. It is complete and yet not burdened with useless matter. The 871 pages are all and each useful.

As year by year the mining industry grows in Ontario and the reports become more numerous, increasing difficulty is found in learning all that has been published on any one subject. The index now before us has not come before it was much needed. It is to be hoped that it will soon be supplemented by a volume covering the years since 1916. The Bureau had expected the present volume to be ready long ago, but owing to war and other circumstances it has appeared later than anticipated. We would advise our readers to secure their copies soon as there is likely to be a good demand for such a volume.

Milling Operations Resumed at Silversmith.

Sandon, B.C.—The Silversmith Mine and Mill have resumed operations. The new Mill, the basis of which is the old Ivanhoe Mill, purchased by the Silversmith, is now handling from 100 to 125 tons of ore. Three shifts are being used and with new equipment, newly built tram, and the necessary electric power available the plant is running smoothly. Work underground has been confined to development for several months.



The above map shows part of the area north of Cochrane which will be traversed by the Ontario Government Railway which is reaching out towards Hudson Bay. We gave some description of the project a couple of weeks ago.

Lignite Carbonization.

By W. W. Odell, (Fuel Engin., U. S. Bureau of Mines).

Of recent years interest in the development of lignite fields and the production of beneficiated fuel has become more general or widespread, simultaneously with the increase in price of high-grade fuel. Not only is it recognized that our supply of high-grade anthracite is limited, but cognizance is taken of the fact that in many localities the average quality of the fuel now being purchased is not so good as that bought under the same name a number of years ago. This difference is primarily due to the increasing amount of incombustible material that is permitted to pass into a coal shipment as coal. The natural result of this higher ash content, and resulting lower heating value, in conjunction with a higher price for such fuel, is that the clean lower grade fuels automatically become relatively more valuable.

The development and utilization of low-grade fuels is not new, but on this continent conditions have not heretofore been favorable to such enterprises. The abundance of the available supply of lignites in this country in locations where other fuel is only obtainable by a long freight haul from distant sources, has made the "lignite problem" a serious one for domestic consumers in such localities as North and South Dakota and Texas.

Work done in North Dakota.

For many years it has ben recognized by Dr. E. J. Babcock, Dean of the Mining Engineering Department of the University of North Dakota, that the solution of the "lignite problem" is of vital importance to the State of North Dakota, and to the development of certain industries in that State. Towards this goal Dr. Babcock has for years been directing experiments in carbonizing and briquetting lignite and in briquetting the carbonized residue, and has made notable headway. In addition to being Dean of Mining Engineering at the University of North Dakota, he can well be regarded as Dean of lignite development in this country. At the mining substation of the University, which is established at Hebron., North Dakota, experiments have been conducted on a semi-commercial scale wherein investigations conducted at the University laboratory at Grand Forks, are amplified.

The studies made under his guidance include briquetting the raw lignite, briquetting the dried and partly carbonized lignite, drying and carbonizing lignite in rotary dryers, horizontal retorts, bee-hive ovens, kilns, and in inclined ovens. Some of the results obtained previous to 1916 are published as Bulletin 89, U. S. Bureau of Mines, "Economic Methods of Utilizing Western Lignites".

If briquets are made simply from dried lignite, other complications are met with in handling the material, such as the strong tendency for the dried lignite to ignite spontaneously. Also, the dried lignite does not lend itself well to briquetting.

The conclusion reached in these studies by Dr. Babcock, was that the best manner of produeing a highly beneficiated fuel from lignite is to briquette a carbonized residue. The aim in general is to produce a fuel for domestic use which, on combustion, will liberate the greatest amount of heat per unit weight of fuel, compatible with an economic method for its manufacture. It is appreciated that a fuel approaching anthracite may be desired for some purposes, whereas briquets capable of giving a longer flame on burning are desired for other uses. The problem as taken up at the University of North Dakota is naturally divided into two phases: First, the carbonization of lignite, so as to make a suitable material for briquetting, and second, the briquetting of the carbonized residue with the minimum amount of a suitable binder to form a firm, resistant and even-burning fuel.

At the present time there are no large commercial plants on this continent where carbonized lignite is briquetted. While much interest has been shown in the experimental work, individual investors in the past have been wisely slow to back schemes for the production of a processed fuel. This has been true not only because of doubt regarding the yields, quality and quantity of products, binder requisites, costs, etc., but perhaps also on account of the many failures in the fuel processing industry. The increasing price of good fuel furnishes much better conditions for the success of such enterprises.

Experiments at Hebron.

During the past summer (1921) experiments were conducted at the Hebron, North Dakota, sub-station under a cooperative agreement between the University of North Dakota and the U. S. Bureau of Mines, for the purposes of ascertaining what results might be expected commercially from a particular type of oven; what methods of control should be used; what yield of gas, tar and ammonia might be realized, and to learn more about the design of a carbonizer best suited for lignite. It is obvious that in erecting or designing a complete plant it is necessary to know the capacity of a unit carbonizer as well as that of the briquetting equipment, and in order to produce the finished product at the lowest possible cost, it is desirable to obtain the maximum capacity in the operation of the carbonizer. These and other important details were given particular consideration during the cooperative tests.

The plan of the work was to carbonize approximately 1,000 tons of raw lignite by continous operation of the carbonizer, briquetting the residue into a firm, solid fuel, and to obtain meanwhile as much data as possible relating to the following:

1. Quality and quantity of gas obtained.
2. Quantity of gas required for carbonizing.
3. Behavior of lignite during processing.
4. Capacity of carbonizer.
5. Quality and quantity of residue obtained under various conditions.
6. Analyses of lignite, residue and the briquets made therefrom.
7. Binder requisites.
8. Charaeter of briquets made.
9. Control methods.
10. Cost of briquetted residue.
11. Quantity of by-products.
12. The design of apparatus suitable for carbonizing lignite.

This program was adhered to as nearly as possible throughout the experiments.

The Lignite Carbonizer.

Various types and styles of retorts and carbonizers have been in use at different times during the previous investigations made by Dr. Babcock and associates at the University of North Dakota and the substation, the

present construction being their most recent result of the continued study of the characteristic properties of lignite, and its behavior when heated. The ordinary gas retorts and the ovens commonly used for the carbonization of bituminous coal, are not suitable as at present designed, for the carbonization of lignite. The carbonizer used during the cooperative tests consisted of twelve inclined retorts (a double row of six). The upper ends are open, and a pile several feet high, of raw lignite, is maintained above them. The carbonized product is drawn off periodically from the lower ends, after being partly cooled by contact with the air ducts or recuperators at the bottom of the setting. Exhaust steam is used to complete the cooling, and is supplied so as to be in contact with the residue at the time it is discharged into the conveyor beneath.

The gas liberated is taken off into a hydraulic main, where a uniform seal is maintained so as to keep a uniform and controllable pressure condition in the retorts. An exhauster draws the gas from this main and forces it through a cooling system, where the tarry vapors are removed, and on to a manifold supplying gas to heat the retorts. The gas is supplied to the lower flues, and preheated air is used for its combustion.

The capacity of such a carbonizer depends on the kind and quality of lignite used, as well as on operating conditions, size of retorts, and other variables. Twenty tons per day of raw lignite were carbonized in this particular unit. A complete report of the results obtained during the experiments is now in preparation by the cooperators.

The briquetting equipment would briquet two tons of mix per hour. Belgian rolls were used, with twenty-two inch face, three rows wide, giving a pillow-shape briquet weighing approximately two and a quarter ounces. Satisfactory briquets were obtained which, while not entirely smokeless, held up nicely in the fire, burned evenly, and withstood severe tests.—U. S. Bureau of Mines Reports of Investigations.

CONSERVATION OF FUELS.

To aid in the conservation of fuels, research into their use in heating and ventilating plants is being conducted at the Pittsburgh Experiment Station of the Bureau of Mines under a co-operative agreement with the American Society of Heating and Ventilating Engineers.

Work on the following problems is now in progress under this agreement:

Standardization of the measurement of dust particles suspended in air.

Study of combustion in domestic heating boilers.

Checking results obtained in the application of the testing code covering house-heating boilers.

The effects on health of temperature, humidity, and motion of air in buildings and plants.

In co-operation with the research bureau of the American Society of Heating and Ventilating Engineers, tests have begun at the Pittsburgh Experiment Station to determine the heat transmitted to the fire-pot alone of a small house-heating boiler when a definite quantity of coal is burned. Later additional sections will be added to the heater and the increase observed in the quantity of heat transferred.

TRAGEDY, COMEDY, AND ROMANCE.

Daily newspapers announce the stoppage of work at Silver Islet, because the vein was a delicate one. Exactly how frail the thing was is inferable. There have been "blind", "gash", "Bilsky", and a whole lot of promising, unpromising, lost and found veins, but the "delicate" variety is something posterity will associate with Silver Islet.

Meanwhile the merrily melodramatic are snowshoe-staking the country-side around Elbow Lake, Northern Manitoba.

T'was ever thus! "One shall be taken and the other left". Larder Lake was staked on the ice. Therefore history is repeating itself. Blanketing the snow blanket—it is just possible—may be the antithesis of two negatives being equivalent to an affirmative. Twin affirmatives, however, let us fervently wish, may not work out as a negative.

Meanwhile, it is not strictly correct that the Hollinger owners have taken on the Murray properties. Individual Hollinger Directors and their friends have entertained the properties, are going to determine the chances, and do not know whether they have a mine or so much moose pasturage. Certainly the outcrops are attractive and deserve all a private syndicate will bestow upon them.—A. G.

MINING QUOTATIONS.

Quotations on Active Stocks on Standard Stock Exchange, Toronto, 25th January 1922:

	High	Low	Last
SILVER			
Aladdin Cobalt	1 3/4	1 1/4	1 1/4
Beaver Consolidated	23	21 3/4	22
Chambers-Ferland	2 3/4	2	2
Coniagas	1.00	1.00	1.00
Crown Reserve	15 1/2	14	15
Foster	1	1	1
Hargraves	7/8	7/8	7/8
LaRose	34	33	34
McKin.-Dar.-Savage	17 3/4	16	17
Mining Corp. of Can.	1.11	1.00	1.05
Nipissing	7.00	6.65	6.65
Peterson Lake	5	4 1/2	5
Temiskaming	35	31	34
Trethewey	9	7	7 3/4
GOLD			
Apex	2 1/4	1 3/4	1 3/4
Atlas	11	9 1/2	10 1/2
Dome Lake	7	6	6
Dome Mines	24.00	22.00	22.25
Gold Reef	2 1/4	1 3/4	2 1/4
Hollinger Cons.	8.10	7.91	7.97
Hunton Kirkl'd G. M.	7 1/2	6 1/2	7 1/4
Keora	10 1/4	9 1/4	10 1/4
Kirkland Lake	33	31	32
Lake Shore M. Ltd	1.31	1.26	1.28
McIntyre	2.30	2.19	2.21
Moneta	15	10 3/4	12 1/2
Newray Mines, Ltd	6	5	5 1/4
Porcupine Crown	15 1/2	14	15 1/4
Porcupine Tisdale	11 1/4	11 1/4	11 1/4
Porcupine V. N. T.	21	19	20
Preston East Dome	3	3	3
Schumacher	36	34 1/4	35 1/4
So. Keora	19 1/2	17	19 1/2
Teck Hughes	31	27	30
Thompson Krist	2	1 1/4	1 5/8
West Dome	7 1/2	7	7 1/4
Wasapika Con. Ltd.	3 5/8	3	3
MISCELLANEOUS			
Petrol Oil	18	16 1/4	18
Rockwood Oil, Gas	1 1/4	1 1/4	1 1/4
Vacuum G.	2 1/2	2	2

What Consolidated "Smelters" Did in 1921

Preliminary figures from the Consolidated Mining & Smelting Company convey their own tribute to the mines and management that could produce over 110,-182,380 lbs. of metals-lead and zinc-even though their average spot value be 4 1c for 1921 as compared with 7.2c. for 1920. Not only did the grand aggregate of these metals produced by the Consolidated company exceed that of the whole Province of British Columbia in any previous year for the same metals, but the value placed upon the lead and zinc and information as to the nature and extent of the ore reserves containing those metals may serve as an ultimatum to competitors that Canada is prepared to cater to the broadest markets. The results of the year's operations are all the more prismatic when it is clearly understood that the increase of almost 57,000,000 lbs. of metals represented a relative loss in the f.o.b. valuation of $28,020. Evidently there is a cross and a crown in the grand total, the company having to contend with distressed metal markets and to liquidate inventories and the banking position. Anyhow, while the "foolish virgins", as it were, among base metal producers were somnolent, the Consolidated trimmed the lamps and went after big business mainly in the Orient, in this fashion:

QUANTITY.

	1920	1921.
Gold, oz.	42,636	51,037
Silver, oz.	1,097,930	1,173,890
Copper, lbs.	4,501,594	3,556,517
Lead, lbs.	26,474,652	57,051,110
Zinc, lbs.	36,995,394	53,131,270

VALUE.

	1920.	1921.
Gold	$ 902,714	$ 1,083,232
Silver	1,281,549	791,985
Copper	601,748	306,754
Lead	1,730,024	1,960,999
Zinc	2,810,890	2,551,895

How much of the 408,346 tons received at the Trail Metallurgical Works of the Consolidated company came from the Sullivan Mine no doubt will appear in the detailed annual report. The drop in copper production leaves it to be inferred that all but a minor fraction of the tonnage treated came from the Sullivan, where developments continue to be exhilarating. Dividing the tonnage of metals produced, by the ore receipts, an approximation of the lead and zinc contents per ton may be reached. Applying that to the millions of tons in place-proved and indicated—it is possible to arrive at an estimate of what the Sullivan Mine means to the company and to Canada. Whether it be a million or two million tons of metals — worth anything the market will take them at — there is no disputing that the mine is making a class for itself on this continent. The most recent reports are so consistently optimistic the company cannot do otherwise than adopt a one speed policy, to which end a large capacity concentrator at Kimberley as well as hydro-electric power are first essentials.

During the past year the customs business with private producers amounted to only a fortieth of the tonnage from the company's properties — and that is another reason why the Trail Metallurgical Works may have to expand for the benefit of the province of British Columbia as a whole. Without the Trail establishment as now organized, the 1921 outputting record might read like a casualty list, notwithstanding the declination of the Granby company to remain in hibernation. That the current year opens auspiciously is shown by the Trail tonnage receipts, which are about ten per cent. higher than the average of the 1921 weekly periods. Of the 8,933 tons received at Trail in the opening week of the year, 124 tons came from other than the Consolidated company's mines. When copper is moving an all Canadian rounded out copper, zinc and brass industry ought not to be a remote possibility, notwithstanding the limited domestic markets and exclusiveness of neighbors. "First catch your hare," is an old maxim, and before copper-zinc finished products are attempted in great bulk something besides present sources of copper, within the organization is required.

A year ago the Consolidated company had a heavy carry-over in metals and a banking position that prompted what has been happening, a huge turnover and aggressive marketing operations. Ample credit facilities always have been accessible to the company, and a good deal of the borrowing having been on capital account, it will be funded in due course when financing can be done upon better terms. With such a mining outlook, not only at the Sullivan but elsewhere, and capital expenditure being completed at Trail, the security behind any issue, in any form should satisfy investors. Prices of zinc and lead have touched low and are going higher. Sources of supply combined with what has been provided at Trail make the Consolidated self-sufficient. It has taken troublesome years to bring this about. That the tributary mines are ready and the metallurgy of the ores satisfactorily solved, that the company can report such an output and make profits when metal markets were so disconsolatory, is reassuring. Furthermore, the concentrator to be erected at Kimberley ought to pay for itself in short order.

The Cruelty of it.

In his remarks at the annual meeting of the Bank of Hochelaga, Mr. Beaudry-Leman was forcefully informative as to leaks in our national economies. In running the scale he omitted several of the higher notes, especially with regard to gold and base metal production, but he touched others, of which this is a whole octave:

"Our efforts should be directed towards reducing our foreign purchases, which, in 1921, amounted to $94,-000,000 for coal; to $67,000,000 for cotton; to $113,-000,000 for steel and iron, etc."

That $207,000,000 for coal, iron and steel is a long way from being neutralized by exports of lumber, pulpwood, pulp, and paper, which are variously denounced in the daily press as so many mediums for profiteering. The sum total of Canada's mineral production is dwarfed by the imports of basic materials, including oils.

Argonaut Gold Financing.

The widespread publicity given to Argonaut possibilities has aroused curiosity regarding the properties. Undoubtedly the assay plans are more substantial than most of the advertising. It is not disputed there are ore shoots of encouraging grade; but the methods employed in raising additional capital invite inquiry as to exactly what was the agreement of the former Huronia Company with the Argonaut Company, which is obligated to erect a mill of a stated capacity, in a given time. If the ore being developed is in Huronia territory, what

was or is the consideration, past, present, or ultimately, for which the Argonaut will have the continuous right of possession? This question is raised. A distribution of shares is being made. In the interest of the Argonaut company, and of the shareholders, the doubt existing is herewith publicly stated, without intentional prejudice, merely to remove the doubt.

Dome Redemption of Capital.

The phrasing of the Dome Mines declaration of the "repayment" of capital to the extent of $1 per share, was studiously devised, no doubt. Return of capital in that form hardly is taxable. Aside from that, however, the precedent is strongly commended. In a sense it is a reversable of the precept that "you cannot eat your cake and have it, too." Capital remains as it was, dividends will apply upon it, shareholders may have their money back in ten annual installments, while they also are having returns based upon the nominal capital of the company at parity. All of which is not an enervating innovation. Furthermore, a word of commendation is due to Mr. De Peneier for his management of the Dome, where operating profits of nearly a million, current assets equivalent to about 50 per cent. of the capital issued, and working capital of about $2,000,000 make safe the dividend position.—A. G.

BRITISH COLUMBIA DID WELL IN 1921.

In discussing the record of the mining industry in British Columbia for the year 1921, Hon. Wm. Sloan, Minister of Mines, places the value of the production at $25,750,608 as compared with $35,543,084 in the previous year, a decline of $9,762,476 or approximately 27 per cent.

These figures show some changes in comparison with those available some weeks ago, increases being apparent in the values attributed to gold, silver, and some of the base metals. The explanation is that the northwestern mineral survey district, which includes Portland Canal, Alice Arm, Queen Charlotte Island, etc., has done better than was expected.

It is estimated that the increase in tonnage mined in this District will amount to about 75,000 tons. The gold output, exclusive of placer, which will just about equal last year, will show an increase of approximately 30,000 ozs. or about 60 per cent greater than last year. This is due to the gold production of the Premier Gold Mining Co. The silver yield for this year will be about 1,500,000 ozs., or about 125,000 ozs. greater than last. This is due entirely to the output of the Premier Mine as the Dolly Varden which gave over 800,000 ozs. last year produced practically nothing in 1921. The Premier's output of silver will be over a million ozs. alone. The copper production will exceed that of last year by nearly 9,000,000 lbs., an increase of about 33 per cent and due entirely to the Granby Company at Anyox.

Notwithstanding the deflation of the prices of metals the total value of the three metals produced in this District (gold, silver and copper) will be greater than last year. In fact taking quantities, not values into consideration, last year's will be the greatest production ever made in this District.

Commenting in general terms on the results of mining activity in 1921, and the prospects for 1922, the Hon. Wm. Sloan, Minister of Mines, is quoted as follows:

"There are several outstanding features in connection with the 1921 history of the industry in British Columbia. One is the record of the Sullivan Mine at Kimberly, which is strikingly reflected in the statistics relative to the output of lead and zinc; another the splendid performance of the Hidden Creek Mine and the Anyox Smelter, which is shown in the volume of the copper production; and a third in the development in the Salmon River Valley, Portland Canal, of a gold and silver producer of first importance, the contribution of which to the precious metals produced by British Columbia for the first time gives an indication of what may be expected from this and other properties being opened up in this comparatively new northern mining section.

"It is remarkable and gratifying that the 1921 production of Lead is estimated to be 3,668,782 lbs. greater than in 1920, the figures being: 1920, 39,331,218 lbs; 1921, 43,000,000 lbs; that Zinc will drop in volume only about 2,208,268 lbs. in comparison with the records of the previous year; and that, even in Copper, for which there has been little or no market, the decrease was not greater than approximately 10,607,676 lbs. the figures being: 1920, 44,887,676 lbs; 1921, 34,280,000 lbs."

Mr. Sloan observes at this point that the manner in which this Province has held her own in the face of adverse conditions almost unprecedented, is a convincing commentary on what can be done when the trade winds are more favourable and furnishes an admirable illustration of what the future holds for the mining industry of the country. It was only a few months ago that, at an International Mining Convention at Portland, Oregon, the American delegates held a session apart from the Canadian delegates to formulate resolutions advocating a tariff against Canadian lead and zinc which was an indication, since justified, that British Columbia's competition in the world's markets was respected.

New Plants for B. C. Mines.

Mining men look forward to important developments during 1922 in connection with the British Columbia Mining Industry. Some of the notable projects anticipated follow: The reconstruction of the Britannia Mining and Smelting Co's concentrating mill at Britannia Beach, the capacity of the new plant being 2,500 tons a day; the re-opening of the Canada Copper Company's Mine and Mill; the construction by the Canadian Consolidated Mining & Smelting Co. of a 500 ton Mill at the Sunloch Mine, Vancouver Island; the construction by the same Company of a 250 ton Mill at the Old Sport Mine, Elk Lake, Vancouver Island; the resumption of operations by the Hedley Gold Mining Co. at Hedley; the construction of the first units of a proposed 5,000 ton Mill to handle the ores of the Rossland Mine by the Consolidated Mining & Smelting Co. and it also is possible that this Company will undertake the first units of a proposed 20,000 ton Mill in connection with the Sullivan Mine at Kimberley. There is expected to be a marked revival of activity on the part of the silver-lead-zinc properties of the Sloean and the Ainsworth as well as an uninterrupted and important development of the Portland Canal District. The placer fields also are likely to be subjected to exploitation of a character in point of intensity not seen for years.

Mr. J. H. Stovel is in charge of the mining department of the E. J. Longyear Co.

Mr. C. O. Stillman, president of the Imperial Oil Co. received scalp injuries in a motor accident in Toronto last Monday.

Northern Ontario Letter

THE SILVER MINES.

La Rose.

Favorable results on the properties of the La Rose Consolidated reflect the general downward trend in the cost of producing silver. The Journal has authentic information that profits from the La Rose operations during 1921 amounted to a little over $120,000. This compares with only $1,000 in profit during 1920. The better showing is due in part to the stronger physical condition of the mines and in part to the big reduction in operating costs. Work has been conducted in a highly efficient manner, the management having taken full advantage of extensive exploration and development work carried on during the past year or so.

Crown Reserve.

Encouraging results on property owned in the Larder Lake district has led to the management of the Crown Reserve ordering the removal of part of the machinery and building material on the old Crown Reserve mine to this new seat of operations in the Larder Lake field. Although the ore on the Larder Lake property is comparatively low grade, yet it is believed to warrant aggressive exploration and development work.

McKinley-Darragh.

No new developments have been reported this week in respect to the reports that New York brokers were making an effort to work themselves into a position of vital influence in the affairs of the McKinley-Darragh. In the meantime, the general opinion is that the mine may be re-opened in the early spring. The stopes alone contain at least 25,000 tons in broken low grade ore.

O'Brien Shipments.

During the month ended Dec. 31, a total of 63 tons of ore were shipped over the T. and N. O. Railway from Cobalt, according to the regular monthly report of Arthur A. Cole, mining engineer. The O'Brien was the heaviest shipper with 33 tons to its credit while the Conjagas sent out 30 tons. The price of silver during December reached a high point of 68 cents an ounce on the 1st, and touched a low of 63¼ cents on Dec. 8th, the average for the period being 65¾ cents an ounce.

Power and labor at Cobalt.

Workmen are plentiful at the silver mines and the supply of hydro-electric energy is abundant. Added to these favorable factors is a slow but gradual decline in the cost of material and supplies. It is believed that as a result of this favorable situation the average cost of producing silver from the mines in the Cobalt district as a whole may be considerably less than 40 cents an ounce for the current year. This preliminary estimate is of necessity governed by the uniformity of operations, regarding which there is every evidence that not only will work continue unremittingly but further favorable adjustment in economic conditions may induce operators to enlarge the scope of work.

Temiskaming.

Reports have been current that the Temiskaming mine would be opened at an early date. Such reports are at best quite premature, although the prospects of general operations being resumed in the early spring are considered to be good. Temiskaming interests are interested in the information coming from Alberta that excellent progress is being made in the development of the Blue Diamond Coal mine, in which the Temiskaming holds a half interest along with the McIntyre-Porcupine Gold Mines. Late advice tends to show that recent achievements on the Blue Diamond show a constant improvement.

Canadian-Kirkland.

It is stated in reliable circles that the question of resuming operations on the Canadian-Kirkland Gold Mines is under consideration by officials of the Crown Reserve Mining Company of Cobalt, which concern interested itself some years ago in the enterprise.

Castle-Trethewey.

With regard to the Trethewey company's operations on the Castle property in the Gowganda district, it is learned that a decision has been reached to incorporate a new company to be known as the Castle-Trethewey, with an authorized capital of $2,000,000, along the lines as previously outlined in the Journal. These shares will be allotted to the present company at the rate of one of the new for four of the old and will leave 1,600,000 shares in the treasury. The present stockholders will be allowed to subscribe for new shares at 10 cents each to the extent of share for share of stock already held. The proceeds are to be used to pay off present indebtedness of about $40,000 as well as finance the reconstruction of a plant and to carry on further underground work.

May develop Sanderson.

A party of interested men visited the Sanderson property this week in connection with the pending deal. It has been learned by the Journal on good authority that the prospects are good for sufficient funds being made available to conduct work on an aggressive scale for a period of at least two years, by which time it is believed the result of work will be such as will make further financing unnecessary. The property is regarded as one of the more promising of the undeveloped groups in the Gowganda district. It is planned to make a start this winter so as to take full advantage of the good sleigh roads in transporting supplies and material to the mine.

THE GOLD MINES.

Hollinger production.

During the four weeks ended Dec. 31st. the Hollinger treated a total of 109,265 tons of ore, the average rate being approximately 3,900 tons daily. This corresponds favorably with the former four-weekly period and is the highest daily average so far in the history of the mine. At times, the daily rate was well above 4,000 tons per day.

The power shortage case.

The case of the Hollinger Consolidated Gold Mines against the Northern Canada Power Company for alleged damages for more than two million dollars has been concluded. Judgment being reserved by Justice Middleton.

The action engaged the attention of a veritable galaxy

of legal talent, the Northern Canada Power Company being represented by R. S. Robertson, K.C., W. N. Tilley, K.C., Hon. Wallace Nesbitt, K.C., and Alex. Fasken, K.C. The Hollinger was represented by D. L. McCarthy, K.C., and J. B. Holden.

Expert evidence, including engineers from New York were examined on behalf of the power company, and the case was perhaps the most interesting of its kind ever heard in the Dominion.

Power development at Sturgeon Falls.

Pending the handing down of a decision in the case between the Northern Canada Power Company and the Hollinger, it is believed no definite action will be taken in regard to arrangements for additional power in the Porcupine district. The heavy snowfall of the current winter assures an abundance of water in the spring and the supply of hydro-electric energy for this year appears to be assured. In the meantime, however, anticipating an increased demand, it is reported on the street that the McIntyre-Porcupine is seriously considering the advisability of erecting a power plant at Sturgeon Falls on the Mattagami River. It has been learned by the Journal representative from officials of the McIntyre that the estimates place 7,000 h.p. as the amount of energy that may be developed at this point. The cost has been officially estimated at approximately $1,100,000. It is also learned that a decision was reached some time ago to proceed with this development, but that in view of the staff at the mine not being in a position to undertake the work, the scheme was left in abeyance. Mining and power development being quite different, it is believed that should the McIntyre decide to go ahead with power development, the work will be placed in charge of experts in the business of hydro-electric development.

Dome disbursements.

On April 20th, the Dome Mines will pay $1.00 per share as "capital return." This comes in addition to the regular quarterly dividend of 2½ per cent, the double disbursement amounting to $1.25 per share or a total distribution of approximately $595,000. Heavy as is this disbursement, it leaves the treasury in a strong position. A feature of present operations at the Dome is that while mill heads are being maintained at between $7 and $8 per ton, there is a substantial amount of extremely rich ore which cannot be treated to best advantage in the present mill and which is being held in reserve pending the making of necessary milling arrangements. This rich ore lies as a big asset for some future date. In an interview with the correspondent of the Journal, H. P. De Pencier, general manager, made the statement that he did not anticipate any power shortage this year.

Porcupine, V. N. T.

Within the next sixty days, the general preparations to re-open the Porcupine V. N. T. Mines will probably be in full swing. This property is the centre of considerable interest in view of the fact that operations were suspended just at a time when work at the 600 ft. level was revealing the presence of high grade milling ore in large quantities. That is to say, the vein at the 600-ft. level was drifted on for a length of only 100 feet, over which distance it showed an average gold content of $9.60 per ton across a width of 11 feet, while the average in the two faces across this width was $11.50 per ton.

Platt Veteran.

A deal is pending for the Platt Veteran claim, the indications being that funds may be provided with which to carry on a comprehensive scheme of exploration and development work. The property derives considerable merit from lying in close proximity to the McIntyre-Porcupine and the Schumacher.

Kirkland Lake road.

There is considerable agitation in favor of the Ontario Government continuing the Kirkland Lake road in an easterly direction through the township of Gauthier to Beaverhouse Lake where the Argonaut Gold is meeting with successful developments. This road would have a total length of about 20 miles from Swastika on the T. and N. O. Railway, through the producing section of the Kirkland Lake district, thence through the township of Lebel where new mines are being opened up, and, finally, through the township of Gauthier which has been staked out solid across the full width of the township from east to west and for a breath of about two miles from north to south. This highway would lie entirely in good mining territory and would serve hundreds of property owners. The first six miles of this road has already been built and macadamized, while the next four or five miles has been cleared and partly gravelled. It is the general hope that the government will proceed during the coming summer to macadamize this last four or five miles and also proceed with continuing the highway right through to Beaverhouse Lake.

Miller-Independence.

The annual meeting of the Miller Independence Mines will be held in Dayton on Feb. 2nd. The general manager, W. E. Simpson, will be present to submit his report.

Option dropped.

According to advice just obtained, the Hollinger option on the Burke claims, at Granite lake has been dropped. This advice has reference to property which was optioned last fall and on which some drilling has been done. No details are available, but the general understanding is that the amount of encouragement met with did not in the judgment of the company, warrant the consummation of a deal.

Teck-Hughes increasing output.

A gold bar worth between $10,000 and $50,000 was sent out this week from the Teck Hughes Gold Mines and the indications point to a greatly increased output of gold from this property as compared with last year's achievements.

Competent management and several years of preparing the mine for highly effecient operation is placing the enterprise among the leading gold producers of the Kirkland Lake field.

Recent development work at the 600 ft. level has announced exclusively in these columns recently, tends to show that the ore is increasing in richness materially as depth is attained.

With regard to this [illegible] prominent mine manager stated to the writer that the main zone of mineralization which passes from [illegible] through the Tough-Oakes, Sylvanite, Wright-Hargreaves, Lake Shore, Teck Hughes, Ore Gold Mines and Kirkland Lake offers probabilities of continuing to great depth in such quantities as may appear to [illegible] eclipse the results heretofore recovered near [illegible]

Coal Trade of N. S in 1921.

By F. W. GRAY.

Last year's review of the coal trade of Nova Scotia put the output capacity of the Province at 6¼ million tons, but stated that a forecast of the actual production for the year "was more difficult to make than at any time since 1914 because there is not the same assurance of insistent demand and uninterrupted outlet for coal that has existed for the past six years."

5,150,000 Tons Produced.

A conservative estimate of the production of 1921 is 5,150,000 tons, so that the assumed capacity of the coal mines was not reached by a tonnage in excess of one million tons. The forecast of a diminished demand was unfortunately only too well fulfilled, and 1921 will be long remembered as a year in which coal demand in North America receded to the figures of fifteen years ago.

Depression in Steel Industry Affects Coal Output.

A very large part of the abnormally low demand for coal is associated with the small production of iron and steel products. The steel industry in 1921 reached the lowest point of production in relation to capacity that has ever been recorded, and while there are signs of revival of the industry, there are no really good reasons to expect more than sub-normal conditions in the iron and steel trades of North America in 1922, particularly in the case of the primary producers. Fabricators of iron and steel and machinery manufacturers may be busier than they have been, but no boom is on the horizon. So far as stimulation of the coal industry by greater activity of the steel industry is concerned, therefore, there are no good reasons to anticipate much greater demand for coal in 1922 than was the case in 1921.

Capacity of Output.

The capacity of the coal mines of Nova Scotia for output was not notably increased during 1921, and may be still assumed at 6¼ million tons. It is probably amply sufficient for the demand that 1922 will see.

The term "capacity for output" is not in this instance only a matter of the physical condition of the coal mines, which has been much improved during 1921, but is chiefly determined by the number of faceworkers. For the past five years, the writer has pointed out that the reduction in production of coal in the Province is exactly related to and precisely proportional to the reduction in the number of the faceworkers which took place during the war, chiefly by reason of disproportionate enlistments of faceworkers.

Surplus of Labor But Shortage of Miners.

The number of actual "miners" of coal, i.e., men who cut and load coal at the working face, is lower today in the Province by some 1,200 men than it was in 1916. Until the number of miners is restored to that of 1916 it should be fairly evident that the coal production of the Province cannot regain the figures of the years from 1913 to 1916.

To those unfamiliar with coal-mines organizations it may seem anomalous that shortage of miners can exist alongside a surplus of mine labor, but this is a condition that now exists, and has existed since 1917 in Nova Scotia. There are too many non-productive workmen at the coal mines and too few coal producers at the working faces. During the year 1921, however, there has been a readjustment of the working forces that has improved the balancing of the organizations, and the proportion of producers to non-producers is greater than for years past, but nothing but immigration, or the coming of a new generation, can replace the actual numerical shortage of miners in the Province when compared with 1916 and the years that preceded the heavy drafts made by the Army upon the miners that commenced in the Spring of 1916.

Production Record.

The trend of production is shown below:

	Output (Long tons)	Percentage of decline below 1913.	Percentage from Cape Breton Is.
1913 . . .	7,263,485	....	81½%
1914 . . .	6,650,031	8½%	81½%
1915 . . .	6,709,951	7½%	82½%
1916 . . .	1,171,434	15%	81%
1917 . . .	5,665,177	22%	77%
1918 . . .	5,211,000	28%	77%
1919 . . .	5,160,000	29%	75%
1920 . . .	5,725,000	21%	74½%
(est) 1921 . . .	5,150,000	29%	77%

While the tendency of production to rest around 5¼ million tons is to be seen from this tabulation, it should be pointed out that the output of 5,211,000 tons in 1918 represented the maximum productivity of the mines in that year whereas the similar figure achieved in 1921 represents from 1,000,000 to 1,200,000 tons below what the mines could have put out in 1921 had the demand permitted them to work steadily throughout the year.

It may be further remarked that the decline of production in Cape Breton to 75 percent of the provincial total did not represent any remarkable increase in the equipment or productivity of the mainland collieries, but was occasioned by the severity with which war conditions pressed upon the larger companies operating in the Island of Cape Breton.

British Empire Steel Corporation.

Writing at the end of 1920, although the arrangements for the consolidation of the coal and steel companies which now form the British Empire Steel Corporation were only mooted, and no certainty existed that the Corporation would be formed, the writer ventured to state, arguing from purely technical premises, that such a consolidation was "a foreordained inevitable event of the future", and if the British Empire Steel Corporation has been formed, it is because it was a proper and necessary proceeding, which should have been undertaken many years ago. The restoration of the original edifice of the General Mining Association is now complete, and it is a thousand pities for Nova Scotia that it was ever disturbed.

Advantages of Merger.

The justification of the fusion of the coal and iron—ore properties of the Dominion and Scotia companies is that, in the minds of the men who are directing the winning of coal and ore, all questions of conflicting lease lines have been wiped out, and there are now no man-made and artificial difficulties, such as formerly existed, to be added to the quite sufficiently difficult conditions of coal extraction from the areas of these two companies. The plans and projections of the combined companies are now made solely with regard to the completest possible extraction of coal, at the lowest possible price, over the maximum life of each mine area, and the conditions of lease conflict which at one time

threatened to greatly lessen the extractable amount of coal, to increase the cost of mining, and to put a premature ending to the life of many mines, have all been removed.

The St. Lawrence Market.

The shipments of coal from Nova Scotia to the St. Lawrence market in the season of 1921 totalled about 1,100,000 tons, which included coal taken by the Canadian National Railways in the Government's own vessels. All of this coal came from the mines of the British Empire Steel Corporation, and it serves as an instance of the flexibility which has been given to the coal-trade by the consolidation to mention that the St. Lawrence shipments, in addition to the usual cargoes from the Sydney collieries, included coal from the Acadia and Springhill colieries on the mainland, and it was possible to give the mainland colieries additional employment in this way which would, under separate control, have been denied to them.

A significant happening of the year was the shipment of two cargoes of Nova Scotia coal by water to Toronto.

The annual shipments of Nova Scotia coal to St. Lawrence ports in pre-war years ranged from around 1,750,000 to 2,000,000 tons. As the consumption of bituminous coal in Quebec has undoubtedly increased in the past seven years by growth of population and concentration of industries in the Province, it would appear likely that the sales of Nova Scotia coal at St. Lawrence ports should increase, always provided it can be sold at a price to meet competition from the coalfields of the United States.

Labor and Wages.

At the end of 1920 the coal miners in Nova Scotia were given an increase in wages which raised the rate of wages from 120 to 130 percent above the rates of 1916. At the time this increase was being negotiated, commodity prices had attained their absolute peak, and coal was selling at the highest figure it attained in recent years. At the date of writing, approximately fifteen months later in time, coal prices have declined to merely nominal figures, spot mine prices in the United States having declined to figures as low as $1.25 per ton. This is a condition largely brought about by over development of the bituminous mines of the United States, which could, if pressed for output over the whole twelve months of a year, probably produce a billion tons of coal. The actual consumption in 1921, admittedly subnormal, will not reach four hundred million tons, and general idleness at the soft coal mines of the United States is a necessary consequence of this disproportion between capacity of supply and available demand. The abnormally small demand is a reflex of high costs of coal production, manufacturers not being able to pay the price asked for coal, which, in its turn, is the result of the maintenance of war time rates of wages in the unionised fields in the United States. It is fairly evident that when the wage contract of the United Mine Workers comes up for revision in the Spring of 1922, the inability of manufacturing industries to function under prevailing conditions will force a reduction in wages sufficient to enable the bituminous mines to sell coal at a price which, while low enough to revive manufacturing, will yield the operators a profit. Present absurdly low spot mines prices for bituminous coal in the United States represent sacrifice sales of so-called "distress" coal, and they are chiefly important to Canadian producers of coal as evidence of acute excess supply over demand in the United States coal trade which will intensify American competition with Nova Scotia coal in the Montreal market next Summer.

The coal-miners in Nova Scotia have refused to entertain any reduction in wages, and the coal companies included in the British Empire Steel Corporation have announced that a reduction in wage rates will be made effective on the 1st of January 1922. As a result of this situation a Board of Conciliation has been applied for under which circumstances further comment would be out of place here.

PORT ARTHUR MINING NOTES.

By J. J. O'Connor.

Developments on the McKellar-Longworth mine, in the Schreiber gold area, are meeting the highest expectations of the operators. The latest spectacular discovery is mid-way between the East and West shafts. The shaft at this point is down 35 feet, and has shown free gold from the collar to the bottom, and is now in extremely rich ore. The West shaft is down 55 feet, on a ten foot vein. Good showing of free gold are constantly being encountered in this shaft.

Half a mile to the westward, another shaft is being put down on the same vein, showing that it is uniform in width, and carries the same character of ore.

At a point, one thousand feet west, from the East shaft, a tunnel has been driven into the hill for a distance of 83 feet. Cross-cutting from the head of the tunnel is now in 60 feet to the north, and 30 feet to the south, for the purpose of cutting the various veins that have been encountered in the prospecting work.

The old Empress Mine, located about 15 miles east of Schreiber, on the same contact as the McKellar-Longworth, has been dewatered, in the interests of Duluth parties.

This mine was originally opened in 1896, when some of the most spectacular gold ore ever seen in the district, was taken from the surface of the vein, and good values continued for a considerable depth, the shaft being bottomed at 93 feet, on a strong, well mineralized vein, carrying fair gold values.

There is an up to date ten stamp mill, in prime condition, on the property. It is understood that active developement work will be proceeded with at an early date.

MAP SHOWING NATURAL RESOURCES

Attention is now being directed towards the country's natural resources, as never before, since it is generally recognized that only by a more widespread utilization of Canada's undeveloped lands, mines, forests, water-powers and fisheries can present day economic problems be solved.

The Natural Resources Intelligence Branch of the Department of the Interior has published a map showing the leading natural resources of each province. In Nova Scotia mixed farming, coal mining and fishing predominate; in Prince Edward Island fur farming and agriculture. New Brunswick has large areas of timber, while mixed farming and fruit growing are outstanding interests. In Quebec may be found a wealth of timber for pulpwood, also minerals such as asbestos, graphite and molybdenite, while in Ontario there are great assests in farms, mines, and forests.

In the Prairie Provinces the prospective settler or investor may obtain adequate returns on capital and labour in either grain growing, mixed farming or ranching, while in British Columbia mining, lumbering, fishing, and fruit growing are among the leading industries. In Alberta there are large resources of coal and many mines have been developed there.

British Columbia Notes.

Active season expected at Stewart.

Stewart, B.C., — Regular shipments of sacked high grade ore are expected from the Silverado Group of Mineral Claims within a few weeks. It will be transported across a gulch by aerial, thence to the lower camp by team, and from that point will be rawhided to tide water. Apart from properties that are being worked as is the Silverado, development being continued and some of the better ore sent out for treatment, the Premier Mine is the only substantial shipper from the district at present. However many miners and prospectors are wintering at Stewart and Hyder and reports from authentic quarters are that the season of 1922 will see important advances made in this important and comparatively new mining section of the Province. George Clothier, the resident mining engineer, is advocating more trails and it is assured that government assistance, as far as finances will permit, will be extended where it is recommended. The regions of Salmon River, Fish Creek, Marmot River, and the more distant Unuk river will see much prospecting and more development on promising properties in the prospect stage than ever before.

The Premier Mine.

Describing recent activities of the Premier Mining Company, Salmon River, Portland Canal District, T. J. Shenton, District Mines Inspector, says that officers in charge at the Mine have been busy during the year in the erection of buildings for the accommodation of the employees, consisting of bunk houses, dry, and wash rooms; in the installation of a steam apparatus for heating purposes and the erection of a hospital which now is completed. In addition the one hundred and fifty ton mill has been completed and has been in operation for several months, the aerial tramway of eleven and one half miles in length likewise has been completed and began operation on the 20th of December last. Further two large compressors, coupled to two Diesel units have been installed and now are in operation, and a concrete foundation has been constructed at the foot of Cascade Creek ready for the erection of housing for the machinery of the main power house which, it is expected, will be finished, early this year.

"The average number of men employed per day for the year was 382, the total tonnage mined 15,129 tons, the total length of tunnel and drifting 4,027 feet, the total diamond drilling done, 6,821 feet. About fifty feet from the entrance of No. 2 tunnel a small shaft, 5 x 6 feet, has been sunk to a depth of 420 feet connecting Nos. 3 and 4 workings. It is supplied with steel cage, guides and the required safety devices, and is used for the purpose of hoisting of lowering men, material, supplies etc."

Mr. Shenton, in concluding, pays a high compliment to the staff officers of the Company who have done efficient work in making ready for an increased output. He predicts that the next year of operation at the Premier Mine will see past records broken.

Hidden Creek Mine

Referring to the Hidden Creek Mine and the smelter operations of the Granby Consolidated Mining & Smelting Company the Inspector of Mines states that low copper prices compelled two cuts in wages during the year, that the number of the employed had to be cut materially, and that the loss by fire of main crusher No.2 at the Mine necessitated the rebuilding and the installation of a new crusher. This was completed in October. "The structure is concrete and fire proof and is a very creditable piece of work." The average number of men employed per day during the year is given as 212, as against 385 for 1920, and the output in wet tonnage from the Hidden Creek Mine for the year is placed at 914,000 tons as against 802, 667 tons for the previous year, an increase of 112, 333 tons.

Belmont Surf Inlet Mine

In regard to the operations of the Belmont Surf Inlet Gold Mines Ltd. the Inspector makes an interesting observation as to development. He says that the Pugsley Mine, which adjoins the Belmont and is owned by the same Company, may be considered an established producer. Ore bins have been built for the handling of the output of the Mine and an aerial tramway installed form these to the bunkers at the head of Surf Mine. The tram is a two-bucket, high-speed reversible type, capacity per bucket 1500 pounds, span between buckets 2,300, operated by a 25 h. p. motor. The elevation between terminals is 390 feet and the capacity per eight hours 100 tons.

Slocan

Slocan City:—Some rich ore is being taken from the Arlington Mine, under lease and bond to R. R. Hedley, and from the Anna Group, owned by Kurt Zimmerman. It is suggested in connection with the former property that there is an opening for the pofitable operation of a cyaniding plant as there are thousands of tons of ore available for such a mill with plenty of power available. With regard to the Ottawa mine, under lease and bond to L. H. Biggar and associates who have had a tube mill in operation during the past year, a few shipments have been made to the Trail Smelter but difficulties have had to be overcome in the completion of the plant, chiefly in the obtaining of pebbles and lining. Now, however, a new steel lining has been acquired and a change made from pebbles to steel balls. The ore put through has shown a saving fully up to the expectations of the leases and shortly the Mine will be operating on the basis of a materially increased output. The Black Prince, Hampton, E. & R. Group, Tamarac, Lilly B. and the Richmond Groups are other properties that have been under development of late.

Prospectors Protective Association

Nelson B.C. :—At the recently held annual meeting of the British Colombia's Prospector' Protective Association officers were elected as follows: Honorary President, Hon. Wm. Sloan; president, J. W Mulholland; vice president, J. C. Riley; secretary, F. A. Starkey; treasurer, R. J. Elliot; executive committee, W. W. Moore, J. Rodway, and J. P. Sherran.

An outline of the achievements of the Association during 1920 was given by Mr. Mulholland after which it was decided to urge the Dominion Government to establish a plant for the experimental treatment of the complex ores of the Kootenay and to petition the Provincial Government to take over the Granite Poorman Mill, or some similar plant, and operate it

The Canadian Miners' Buying Directory.

Acetylene Gas:
Canada Carbide Company, Ltd
Prest-O-Lite Co. of Canada, Ltd.

Acetylene Welding:
The Toronto Iron Works, Ltd.

A.C. Units:
Powley & Townsley, Limited.

Agitators:
The Dorr Co.
Can. Chicago Bridge & Iron Co., Ltd.
Horton Steel Works, Limited.

Air Compressors:
Belliss & Morcom, Ltd.
Laurie & Lamb

Air Hoists:
Canadian Ingersoll-Rand Co., Ltd
Mussens, Limited.

Air Receivers:
The Toronto Iron Works, Ltd.

Alloy and Carbon Tool Steel:
Peacock Brothers Limited.

Alternators:
MacGovern & Co.

Aluminium:
Spielman Agencies, Regd.

Amalgamators:
Northern Canada Supply Co.
Mine and Smelter Supply Co.
Wabi Iron Works.

Antimony:
Canada Metal Co.

Antimonial Lead:
Pennsylvania Smelting Co

Assayers' and Chemists' Supplies:
Dominion Engineering & Inspection Co.
Lymans, Limited
Mine & Smelter Supply Co.
Pennsylvania Smelting Co.
Stanley, W. F. & Co., Ltd.

Ash Conveyors:
Canadian Link-Belt Company

Ashes Handling Machinery:
Canadian Link-Belt Co., Ltd

Assayers and Chemists:
Milton L. Hersey Co., Ltd
Campbell & Deyell
Ledoux & Co.
Thos. Heys & Son
C. L. Constant Co.

Asbestos:
Merritt & Co.

Balls:
Hull Iron & Steel Foundries, Ltd
Peacock Brothers Limited.
The Wabi Iron Works.
The Hardinge Conical Mill Co
The William Kennedy & Sons, Ltd.

Ball Mills:
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd
The Wabi Iron Works
The William Kennedy & Sons, Ltd

Babbit Metals:
Canada Metal Co.
Hoyt Metal Co.

Ball Mill Feeders:
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd

Ball Mill Linings:
Hardinge Conical Mill Co
The William Kennedy & Sons, Ltd.
Peacock Brothers, Limited
Hull Iron & Steel Foundries, Ltd

Belting—Leather, Rubber and Cotton:
Canadian Link-Belt Co., Ltd
The Mine & Smelter Supply Co
Northern Canada Supply Co
Jones & Glasco.

Belting.
R. T. Gilman & Co
Gutta Percha & Rubber, Ltd

Belting—Silent Chain:
Canadian Link-Belt Co., Ltd
Hans Renold of Canada, Limited, Montreal
Jones & Glassco (Regd.)

Belting (Transmission):
Goodyear Tire & Rubber Co

Belting (Elevator):
Goodyear Tire & Rubber Co

Belting (Conveyor):
Goodyear Tire & Rubber Co
Gutta Percha & Rubber, Ltd

Bins and Hoppers:
The Toronto Iron Works, Ltd.
Can. Chicago Bridge & Iron Co., Ltd.
Horton Steel Works, Limited.

Blasting Batteries and Supplies:
Canadian Ingersoll-Rand Co., Ltd
Mussens, Ltd.
Canadian Explosives, Ltd.
Powley & Townsley, Limited.

Bluestone:
The Consolidated Mining & Smelting Co
The Conlagas Reduction Co., Ltd.

Blowers:
Canadian Fairbanks-Morse Co., Ltd
Northern Canada Supply Co.

Boilers:
Canadian Ingersoll-Rand Co., Ltd
Marsh Engineering Works
R. T. Gilman & Co.
The John Inglis Company
Wabi Iron Works.

Blue Vitriol (Conlagas Red):
Canadian Fairbanks-Morse Co., Ltd.

Bortz and Carbone:
Diamond Drill Carbon Co.

Boxes, Cable Junction:
Standard Underground Cable Co. of Canada, Ltd.
Northern Electric Co., Ltd.

Brazilian Rough Diamonds:
Diamond Drill Carbon Co.

Brazilian Mica:
Diamond Drill Carbon Co.

Buggies, Mine Car (Steel)
Hendrick Manufacturing Co

Brazilian Ballas:
Diamond Drill Carbon Co.

Brazilian Rock Crystal:
Diamond Drill Carbon Co.

Brazilian Tourmalines:
Diamond Drill Carbon Co

Brazilian Aquamarines:
Diamond Drill Carbon Co.

Bridges—Man Trolley and Rope Operated—Material Handling
Canadian Mead-Morrison Co., Limited

Bronze, Manganese, Perforated and Plain:
Hendrick Manufacturing Co.

Buckets:
Canadian Ingersoll Rand Co., Ltd
R. T. Gilman & Co
Hendrick Manufacturing Co
Canadian Link-Belt Co., Ltd
Marsh Engineering Works
Mussens, Ltd.
MacKinnon Steel Co., Ltd
Northern Canada Supply Co
The Wabi Iron Works

Buckets, Elevator:
Canadian Link-Belt Co., Ltd
Hendrick Mfg. Co
Peacock Brothers Limited.

Cable—Aerial and Underground:
Canada Wire & Cable Co
Northern Canada Supply Co
Standard Underground Cable Co. of Canada, Ltd
Peacock Brothers, Limited

Cableways:
Canadian Mead-Morrison Co., Limited
Fraser & Chalmers of Canada, Ltd
Mussens, Ltd
The Wabi Iron Works
R. T. Gilman & Co

Cages:
Canadian Ingersoll-Rand Co., Ltd Montreal Que
Northern Canada Supply Co
Fraser & Chalmers of Canada, Ltd
The Electric Steel & Metals Co
The Mine & Smelter Supply Co
Mussens, Ltd
The Wabi Iron Works

for the benefit of small property owners, giving advance payments on shipments in order that development might proceed. It was pointed out in this connection that there are in eastern British Columbia a large number of properties that could be operated on such a basis.

Ore receipts at Trail

Trail B.C.—Ore receipts in gross tons at the Trail Smelter of the Consolidated Mining & Smelting Co. were 8933 from the 1st to the 7th of January. Of this 8809 tons were from the Company Mines. Other shippers were the Horn Silver, Similkameen; Knob Hill, Republic; and Whitewater, Retallack.

Tidewater Copper will resume

Sidney Inlet B.C.—Operations will be resumed soon on the Tidewater Copper Company's property, Sidney Inlet, Vancouver Island. Important ore reserves are said to have been blocked out during the period of inactivity at the plant.

B.C. Chamber of Mines

Vancouver B.C.—An appeal has been entered by the Engineer Mining Company against the recent judgment handed down by the British Columbia Courts which leaves the property in the hands of the heirs of the late Allan I Smith. It is said that the action will be carried to the Privy Council before the litigants will be content to consider the issue settled.

The case involves title to the Engineer Mine of Atlin District B. C., believed to be the richest free milling gold property in the Canadian West. At the annual meeting of the British Columbia Chamber of Mines held recently reports were submitted of the past year's activities and optimistic predictions made as to the future of the industry in the Province. Officers were elected as follows: Honorary president, Hon. Wm. Sloan; honorary vice-president, Mayor Tisdall; president, Ald. Frank Woodside; first vice-president, H. P. McCraney; second vice-president, E. J. Donohue; treasurer, W. M. Rooke; executive, P. N. Anderson, H. L. Patten, E. E. Bland, K. J. Burns, G A. Collins, S. J. Crocker, F. J. Crossland, G. S. Eldrige, R. Gelletly, R. R. Hedley, E. H. Lea, J. M. Lay, N Thompson, A. M.Whiteside, and Blake Wilson.

Geological Congress

Dean R. W. Brock, of the University of British Columbia, who is the secretary of the International Geological Congress, announces that this organization will meet at Brussels, Belgium, from the 10th to the 19th of August, 1922. The last Congress took place in 1913 at Toronto, Ont., Canada. Plans had been made for a meeting in Belgium in 1916 but the Great War made a postponement necessary. Nine years ago geologist and mining men assembled in Toronto from many countries, and took advantage of the invitation of the Dominion Government to visit places of interest from a scientific point of view, throughout Canada. Tours were arranged by the geological survey department, and delegates were shown portions of the maritime provinces, the Cobalt Sudbury and Porcupine Istricts and other mining fields of Ontario, much of British Columbia, and some of Alaska, including the Bering Sea. Expeditions throughout the Pacific Coast province covered the Crows Nest area, the costal region, Vancouver Island, and territory adjoining the Grand Trunk Pacific Railway main line.

On that occasion an important and authoritative pamphlet on the world's coal resources, complied by officers of the Canadian Geological Survey was read. The editors were Mr. D. B. Dowling, Mr. William McInnes and Mr. W. W. Leach, since deceased. The result was the assembling, in concise form, of valuable information concerning coal fields in all quarters of the globe. Practically all the civilized nations contributed, and essays in nearly all the languages had to be translated for the convenience of the editors in their huge task.

For the enlightenment of the guests guide books had been prepared by the survey department, which contained much information relative to mineral fields and mining conditions in the vicinity of the Canadian Railway routes.

Prior to the Canadian congress a similar meeting was held in 1910 in Sweden, when iron deposits throughout the world formed the principal subject of discussion.

At the Brussels meeting, representatives of every country, probably with the exception of Germany, will attend. The head of the survey department, Ottawa, will be Canada's spokesman. Dean Brock will attend from Vancouver.

A suggested list of subjects for discussion is as follows.

1. The tectonics of regions with Hercynian folds. 2. The geology of the carboniferous period. 3 . The relations between folded zones and down-warped zones. 4. The geology of Africa. 5. The relations between the geological and palaeontological evolution of the southern hemisphere and that of the northern hemisphere. 6. The tectonics of Asia. 7. The lithology of sedimentary rocks. 8. The geology of petroleum.

The congress will be in session from August 10 to August 19. During the week preceding the convention various excursions are to be held.. There will be excursions through Central Belgium, from Arlon to Brussels, taking in the valleys of the Semois, the Meuse, the Orneau and the Dyle, and through Eastern Belgium.

During the session the visits will be to the district about Soignies and the Ecaussines, to Quenast, to the grottoes of Han and De Rochefort, to the grotto and surroundings of Remouchamps, to Liege, to Spa, to the valleys of the Sennette and the Somme, to the district surrounding Namur and the Fault of Samson, to Lan delies, and to Louvain. The tertiary of Brussels will be investigated.

After the session, from August 21 to September 3, the programme comprises studies of the cretaceous and tertiary of Mons, the region of Bastogne, the general tectonics of the palaeozoic of Belgium, and the stratigraphy of the Westphalian of Belgium.

Testing of magnetite.

Percy Scott Leggatt, of Thos. Summerson & Sons Ltd. , passed through British Columbia recently on his way to New Zealand where he is interested in planning the establishment of an iron and steel industry. Mr. Leggatt is quoted as asserting that in New Zealand he proposes making immediate arrangement for the erection of a plant to handle titaniferous magnetites by the electro-thermic method. It is said that in this way iron sands of New Zealand have been successfully converted into qig iron and high grade steel. A few months ago the British Columbia Government sent twenty tons of magnetite ore to Thos. Summerson & Sons for treatment and Mr. Leggatt reports that the results obtained were satisfactory.

EDITORIAL

BRINGING HUDSON BAY CLOSER.

We published in the last number of the Journal a map showing the route of the T. & N. O. railway north from Cochrane towards Hudson Bay. Contract for the construction of this seventy mile extension has been let, and the new district will doubtless be quickly opened up.

It will be noted that the area traversed is for the most part underlain by Pre-Cambrian rocks. Unfortunately for the development of its mineral resources, these rocks are well hidden by a thick blanket of clay. There will be few if any rock cuts necessary along the seventy miles of railroad and there are few rock outcrops in the area.

While not very promising as a mineral area, the country is well suited for agriculture and for forest products industries. It is also well supplied with water powers, which are as yet undeveloped. As a means of easier access to Hudson Bay, the railroad has however, part to play in the development of mineral resources.

Explorations of the area traversed by the railway show that it is for the most part good agricultural land, the clay being more liberally supplied with lime than the soils further south. This lime content has doubtless resulted from weathering of the Palaeozoic limestones that occur a short distance to the north. The glacial muds here are naturally higher in lime than those well down in the areas of Pre Cambrian rocks. It has been pointed out by Mr. Jos. Keele, who studied the clays, that they are quite similar to those of the southern peninsula of Ontario, which is a limestone area.

The forests will furnish the railway with most of its business for some time. There will doubtless soon be activity in wood cutting, and pulp and paper mills will have a new source of raw materials. The railway taps several streams that will be useful in lumbering operations over a large area.

The mineral resources of the Hudson Bay area will not be immediately tapped by this railway extension, but they are brought appreciably nearer and exploration of them will come more quickly now. Owing to lack of transportation the Bay has always seemed much further away than it really is. It is well to remember that the extension of the line will at New Post bring the railway only to the latitude of Winnipeg. Ninety miles further north, brings us to Moose Factory and tide water. The exploration of Hudson bay area with a view to the establishment of industries other than the fur industry is only beginning.

OIL AND OIL SHALE

In the resume of Canada's oil problem published in this issue of the Journal, emphasis is laid upon production from wells. This is logical, as it is from oil wells that the world draws its present supplies. On all sides one hears of diminishing resources in known oil fields, and the life of the present oil industry is limited by pessimists to a few score years, optimists extend this limit a trifle.

The uses of oil in large quantities have lately been extended surprisingly, considering the limited reserves assured. It may be merely matters of expediency and of temporary economy that have induced shipping companies to introduce the use of fuel oil in their fleets, and that have substituted a valve for the locomotive fireman's shovel. But we prefer to think better than this of the men who are directing some of the world's largest and most important business enterprises; we suggest that they have in view sources of oil supply that will serve them far beyond the exhaustion of the present oil fields.

A bulletin just received [Oil Shale — a Resume for 1921 by Victor C. Alderson, President Colorado School of Mines] presents a stimulating review of the efforts of oil shale enthusiasts during the past year. Salient features are the large amounts of oil shale of good quality available for exploitation, the wide geographic li-

[illegible] of these deposits, and the number of experimental plants at present in operation. Canada is credited with "commercial beds of oil shale" in New Brunswick, Nova Scotia, Quebec and Queen Charlotte Islands, and Newfoundland has claim as well. Our only experimental plant is the one near Moncton, New Brunswick, which has been alluded to in previous issues of the Journal.

This bulletin suggests that there is at present not a wide difference in price between well oil and shale oil, if the latter should be produced from the better deposits and in large quantities. With a comparatively small increase in the price of oil, production from shale will supplement the present production from wells, and the world will be assured of cheap motive power for its automobiles, ocean liners and aircraft for an additional few score years.

From published information, it would appear that the attention of oil shale metallurgists is being confined solely to the development of retorts particularly suitable for each of the various types of shale. As usual, some proponents of special retorts have waged a wordy war upon the advocates of other types. It might have been better worth while to have reviewed in a general way the metallurgical field involved. It might be that retorting is not the only possible means of profitably treating oil shales. We shall draw an analogy as a means of defining this suggestion.

For many years miners and metallurgists struggled with the problem of producing sulphur profitably from the limestone beds of Louisiana and Texas. All efforts went for naught until there came along a man with an idea and the pertinacity to put his idea into effect. Hermann Frasch had become well acquainted with the characteristics of sulphur when he invented and applied the means for removing it from Canadian crude petroleum. When, in 1890, he proposed to melt sulphur in its native beds and bring it to the surface through a pipe the idea was ridiculed. Efforts lasting for ten years proved the commercial value of the idea. Today sulphur recovered by the Frasch method dominates the world's markets.

Is it not possible that the mining or quarrying of oil shale may be unnecessary, and that the oil can be recovered without seriously disturbing the strata in which Nature has it in store? The Journal would welcome a discussion of this idea.

INSTITUTE POLICY.

In the January bulletin of the Institute of Mining and Metallurgy there is an interesting article by the secretary, Geo. C. Mackenzie, on Institute Policy. While this is a matter of special concern to the members of the Institute it is a matter of concern to others also. Briefly, it is an argument in favor of making membership in the Institute attractive to all those in mining or allied industries who are in responsible positions, whether in the technical or financial operation of mining companies, metallurgical companies or allied industries. It is well known that for some time there has been undue stress put on technical qualifications in considering applications for membership. Adoption of Mr. Mackenzie's policy would make the Institute more truly representative of the mining industry.

A GOLD SESSION.

It is announced in the January bulletin of the Canadian Institute of Mining and Metallurgy that one of the features of the annual meeting will be a session on gold. This will include a series of papers dealing with the economic aspects of gold production. Other papers will deal with the geology of some of our gold deposits and with mining methods. Through the courtesy of the Ontario Government, a moving picture taken at mines in the Porcupine district has been secured for the meeting.

The meeting of the Institute is to be held in Ottawa on March 1st and following days.

CANADA'S MINERAL RESOURCES.

In this number of the Journal we publish a letter from Mr. C. M. Campbell on the mineral wealth of Canada. Mr. Campbell criticizes a statement made in our Dec. 9th number and gives reasons for believing that our mineral resources are extremely limited.

We are willing to agree with Mr. Campbell that compared with the known mineral resources of the United States the known resources of Canada could not properly be said to be huge. We are also of his opinion that the word "illimitable" is not a good one to use without qualification. We are also willing to agree with him that the limits of some of our ore deposits have been determined. We do not dispute his statements of fact and we recognize that his opinion is one that has been founded on experience in searching for ore deposits which his company might profitably work. Anyone who thinks that it is an easy matter to find a good ore deposit will do well to read Mr. Campbell's letter.

While we agree with much that Mr. Campbell has to say, we are nevertheless of the opinion that much more ore will be found in this country, that some of the ore deposits are known to be very large and that their limits are far from determined yet. We are much more familiar with the situation in Ontario than with that in British Columbia; but we have little doubt that the Western Province will do better than Mr. Campbell would have us believe, for discoveries are being made there that have a bearing on future production.

Development of some of the recent discoveries may prove that they should be classed as "discoveries of outstanding importance". We do not forget that the discoveries at Sudbury, Cobalt, Porcupine and Kirkland Lake were not considered of much importance until development had proved that they were. It is only after

much work has been done on an ore deposit that its tonnage can be estimated with any degree of accuracy, and consequently one seldom knows whether a recent discovery is of "outstanding importance" or not. We may have opinions based on experience and knowledge of the facts; but demonstration of facts requires years of work.

It is worthy of note that practically all, if not all the metal mines operating in Ontario to-day are working deposits discovered during the past twenty years. Most of them are drawing their ore from deposits discovered during the past ten years and many from discoveries made during the past five years. It may be true that these deposits do not compare favorably in size with some of the big American copper mines; but size is not the only thing that determines the importance of ore deposits.

Mr. Campbell's comparison of Canada's known mineral resources with those of the United States should, as he says, remind us that we have little to brag about. We agree with him that our present output is relatively small; but we are satisfied that the possibilities for the future are more in our favor. The mineral output of the State of California, in 1921, thanks largely to oil, was valued at $244,856,910, or more than that of all Canada. We are in very unfortunate circumstances with regard to some imporant minerals, notably, iron and petroleum, and it is well not to forget the fact. We have made such frequent reference to our shortage of oil and iron ore and to our lack of coal in Central Canada that our readers will know very well that our confidence in the future of mining is not based on the assumption that we have these very valuable minerals in quantity or locality where we most need them. We would make much greater progress in Canada if we had the iron and oil resources of the United States; but our shortage of these minerals should not make us pessimistic with regard to other minerals. The recent mining history of Ontario shows that we have much greater mineral resources than could have been demonstrated a few years ago. We need enterprising men to find and make use of our ore deposits. We need to have warnings from men of experience like Mr. Campbell, so that the difficulty of finding and successfully developing ore deposits will be understood. The men who make mines know these difficulties better than most men, they know that new mines, like any new business enterprise, result from the persistent efforts of men who realize that it takes money and labor to determine whether any ore deposit can be profitably worked or not. The results of such work as has been done in recent years in Northern Ontario should be enlightening to anyone who thinks that we have already found and delimited any considerable part of our mineral resources.

Mr. Campbell calls attention to the fact that some formerly important mining districts have ceased to be productive. And why should they not? The business of mining is to recover valuable constituents of ore deposits at the greatest possible profit. The life of most mines is short, but it would be much shorter if we knew at the beginning of operations all that is later learned about the ore deposits. Length of life of a mine is largely determined by opinions concerning the unknown parts of ore deposits, opinions that influence financing and plans for extraction of ore, opinions that are modified as daily development work brings out additional facts and as methods of treatment improve and as prices of mine products change. Ability to determine the facts in advance of the work would in most cases result in shortening the life of a mine and increasing the profit. It is no discredit to a district that its mineral resources have been worked out and utilized in a short period of years. It is to a considerable extent lack of knowledge and scarcity of enterprising men that results in delay in converting ore deposits into useful commodities.

In expressing the opinion therefore that we have large mineral resources we are not bragging. We are calling attention to the fact that Canada appears to have an abundance of minerals that are not being turned to account as rapidly as they should be. Those who undertake to develop mines will not all succeed, they will experience difficulty in finding promising properties at low cost and difficulty in deciding what amounts of money should be spent in testing operations and difficulty in obtaining the money necessary to carry out their plans. Such things are however, not peculiar to mining, for they occur in the growth of any new enterprise. If it were not for such difficulties all our ore deposits would have been found and mined long ago and our mineral resources could then be properly said to have been limited. We have a long way to go yet before we will know definitely what our mineral resources are. We know that they are large and from what we know we hold the opinion that they are very large.

POWER FOR THE GOLD MINES

It appears probable that the work of harnessing more water powers for duty at the gold mines will be proceeded with soon. There are still difficulties in the way of those who wish to get ahead with development but it will not be surprising if during this year the power situation is very much improved.

There will likely soon be a decision in the case between Hollinger Consolidated Mines Ltd. and Northern Canada Power Co. in which the mining company claims damages owing to power shortage. There should be soon a report from the Temiskaming and Northern Ontario Railway Commission that will have a bearing on the application of the Hollinger company for power rights on the Abitibi river. There is already reported, but not confirmed, an agreement for development of water power at Sturgeon Falls on the Mattagami river by the Northern Canada Power Company.

The importance of the proposed development of water

powers lies in the fact that all the available power is now required and that plans for increasing gold production at Porcupine are dependent on increase of power.

THE PREMIER MINE.

A story from Vancouver is to the effect that a rich strike has been made at the Premier mine at Stewart, B. C. This mine has been doing remarkably well lately and made a large production during the past year. What importance is to be attached to the news of a new strike is doubtful; but it lends new interest to the good reports that we have recently had on the Premier. From this distance the Premier looks like a coming big mine.

HOLLINGER PLANS.

It has been announced that the plans for expansion at the Hollinger call for increasing the output to seven thousand or eight thousand tons daily. This would double the output of ore and very largely increase the output of gold. We assume that the larger scale operations would be accompanied by some reduction in average value of ore treated, as some ore now left unmined will doubtless be extracted when conditions are more favorable.

These plans cannot be carried out until more power is available; but there will doubtless be little delay in preparing for expansion once the power problem is settled.

VENTILATION OF MINES.

The use of compressed air blowers as an aid to ventilation in mines was recently made the subject of investigation by the U. S. Bureau of Mines. The results of study indicate that the blowers are far less efficient than small fans. The investigators found that by use of small unit fans and galvanized iron pipe a supply of fresh air to mine openings is obtainable at about one-hundredth the cost of that obtained by the use of compressed air blowers. In many cases the more costly method gives practically negligible results compared with that of the fan method.

The use of blowers is sometimes justified as a temporary expedient; but publication of this report should make installation of permanent ventillation systems in mines a matter that will receive earlier attention than it does in many cases.

The Late R. W. Thomson

Announcement was made recently of the death at Kamloops B. C. of R. W. Thomson, who was appointed resident mining engineer in charge of the Central Mineral Survey District of this Province in 1917. While in good health Mr. Thomson rendered effieient service and was highly respected and personnally very popular among the mining men of his district. Mr. Thomson graduated from Toronto University in 1893 with the degree of mining engineer and Bachelor of Aplied Science. From 1895 to 1907 he was employed in all departments of mining work in South Africa, progressing from a sampler to a mine manager. His South African experiences included service with the British in the Boer War. Coming to Canada in 1907 Mr. Thomson was engaged for two years in operating and reporting upon properties in the Cobalt district. From 1909 to the time of his death he had been identified with the mining industry of British Columbia. Mr. Thomson was a member of the Canadian Institute of Mining and Metllurgy.

THE IRON INDUSTRY

By J. J. O'Connor

There are few, if any, more practical contributions toward the solution of that seemingly age-old problem, of how to establish an independent, self-reliant iron industry in Canada, than that offered by Mr. W. M. Goodwin, in a recent issue of the Journal. The key note is co-operation of practical business men with the highest scientific knowledged obtainable, in order that methods may be evolved, and means provided for the utilization of our own ores, as a basis for the industry.

Mr. Goodwin's suggestion, that an iron trade association be formed, is both feasible and pratieable, and could be brought about at comparatively small expense. No great trade enterprise of today is conducted without such an organization, in full co-operation with the best that science offers, in every detail pertaining to the operations.

That the manufacture of iron and steel is worthy of such an organization, is beyond question. The many ramifications of the industry multiply the necessity for such assistance, in trade, legislation, sources of raw material, the application of science, and greater, than all, the present condition of the industry in Canada.

The precedents for such aetion are limited only by the number of manufaeturing interests in this and other countries, where the fullest advantage is taken of all that seienee and practieal business methods is capable of accomplishing.

If permissible, advantage should be taken of the meeting of the Canadian Institute of Mining and Metallurgy, at Ottawa, in March next for the furtheranee of the timely suggestion of Mr. Goodwin. A representation of the men interested in metal mining and metallurgy would be present there, in greater numbers than would be likely to attend a conference called for this especial purpose, Both the time and the place would be opportune. Cabinet Ministers and Members of Parliament could attend, and learn much of the requirements necessary to place Canada in an independent industrial position, and the possibility of promoting the iron and steel industry through legislative channels.

PACIFIC COAST PIPE

The Pacific Coast Pipe Co. Ltd. of Vancouver has issued a catalogue deseribing wood stave pipe, tanks etc. The company has made many installations of wood stave pipe, for water supply, hydro eleetric pow er etc. and a large number of wood stave tanks for the mining and pulp and paper industries. Many companies use their B. C. fir tanks. The company has been in business in Vancouver since 1904 and its produets all well known in all parts of Canada.

The Influence of Rock Structures
ON QUARRY METHODS.

By Oliver Bowles

Much has been written and said on the relation of rock structures to problems in the development of ore deposits, and many eminent geologists and engineers have devoted careful study and untiring energy to the solution of such problems. It is generally recognized that a proper interpretation of rock structures is essential to success in metal mining, particularly where complexities are liable to arise through faulting and folding. It is noteworthy however that a diligent search of literature, and contact with many consulting geologist and engineers, have revealed a striking lack of similar activity in the broad field of non-metallic mining. This is the more remarkable in view of the tremendous importance of the non-metallics in the economic life of every community. It seems appropriate to mention that the Canadian Department of Mines has surpassed similar oranizations in most other countries in the volume of published work on non-metallic mineral mining.

The inefficiency of operation, and the high percentage of waste that characterize a number of the non-metallic mining industries is due in some measure to a lack of understanding of the structural features of the deposits, and a failure to take these features properly into account in working out the best mining methods. A knowledge of the geologic structures of rock is just as essential a factor in quarrying as it is in the mining of metallic ores. Furthermore the quality of many non-metallic products is largely controlled by the structural characteristics of the parent rock, while such characters have little or no influence on metallic products. Gold bars are similar whether derived from lode or placer, but granite blocks whether red or gray, coarse-grained or fine-grained, sheets of mica stained or clear, or masses of asbestos whether brittle or pliable, must retain throughout their entire lives, the inherent physical characters they possess when first discovered in the earth, and their value depends to a very great extent on these characters. Rock structures have, therefore a profound influence both on methods of operation and on the quality of the non-metallic products. The purpose of this paper is to emphasize the influence of such structures on the quarrying and mining of non-metallic minerals, with particular reference to various types of stone.

Quarrying of Limestone

Even in the quarrying of rough stone such as limestone for road building or cement manufacture, the structural features of the rock may have a definite influence on quarry efficiency.

For example, drill holes for blasting should be arranged in accordance with joint systems, for if an open joint occurs between the drill hole and the open face, it will cushion and diminish the disruptive force of the blast beyond the joint, thus necessitating excessive secondary blasting. The presence of open joints may also have a decided influence on drilling, especially if the joints are inclined from the vertical, for if a drill meets a joint at an angle its course may be diverted so that the drill will bind, and the hole may be lost. Where a drill is thus diverted from its perpendicular course so that it binds, it is customary to throw small pieces of iron into the hole, for hard obstructions retard the downward progress of the drill, permit it to enlarge the the hole and straighten its course. Such procedure is destructive to drill bits, but it is deemed better to take drastic measures than to abandon a costly drill hole. A knowledge of the trend and dip of open joints would enable drillers to avoid much of the loss incurred through forced abandonment of unfinished drill holes.

The dip of the beds is another structural feature to which insufficient attention is given in opening up limestone quarries. If the quarry is developed in such a way that the face is advanced in the direction of dip, blasting forces the blocks up the slope of the beds, and the upper beds bind the lower ones. It is comparable to an attempt to remove shingles from a roof beginning at the eaves rather than at the ridge. For efficient blasting the quarry should, therefore, be planned in such a way that the face is advanced in some direction other than the direction of dip.

Dimension Stone

It is, however, in the quarrying of dimension stone that rock structures have the most profound influence on quarry methods. Brief reference may be made to the influence of joints on the process of quarrying marble. The proper direction and spacing of the cuts by which marble is dissected into blocks are governed chiefly by the direction and proximity of joints. Many quarrymen fail to realize that joints tend to occur in two systems, commonly crossing each other approximately at right angles, and failure to take this fact into account results in cutting out the blocks in such a way that joints cross them diagonally, resulting in excessive waste. The operator who makes a careful study of joint systems, and maps them accurately, is enabled to plan the direction and spacing of channel cuts and lines of wedge holes in a way that results in reducing waste to a minimum, and is obtaining a maximum number of sound blocks.

Slater Quarrying

In slate quarrying, to which the writter has devoted much study for several months, rock structures are of first importance. The fissility or ease of splitting known as slaty cleavage, which is developed in the rock by geologic processes, is the one feature above all others that gives to slate its economic value. Next in importance to slaty cleavage is bedding, which depends on sedimentation. The attractiveness and durability of slate depend in a large measure on chemical or mineralogical composition and texture and as slates were originally deposited in sedimentary form in deep water individual beds were fairly uniform over large areas. Therefore, wherever high grade slate is found, a continuance of the deposit is to be sought by following the bed in which it occurs. Great difficulty may be encountered in this process for as in the Slatington District of Pennsylvania folding may have carried the desired bed below workable depth and operations must be conducted along the strike on the opposite limb of the fold.

Presented at the Toronto Meeting of the A. A. A. Sc.

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even on an adjacent fold. The intelligent operator is therefore obliged to depend for the successful solution of his problem on the proper interpretation of the folds, and through complexities of deformation this may be no easy task.

The attitude of the beds is the chief factor governing the depth and lateral extent of slate quarries. Where the bedding is nearly vertical as at Monson, Maine or in eastern Northamton County, Pa., the quarries are deep and relatively restricted in lateral extent, for following the good beds results in vertical extension. Where the bedding is inclined at angles of 30 to 60 degrees from the horizontal as in Vermont the excessive overburden encountered in following the dip usually precludes deep quarrying, and development must take place along the strike. Thus quarries in such a region tend to be wide and shallow.

It is not to be assumed therefore, that deep and relatively narrow quarrying in Pennsylvania, and Maine; or wide and shallow quarrying in Vermont, are occasioned simply by preference of operators, for they result entirely from differences in the attitude of the beds.

The difficulty encountered in removal of heavy overburden may be overcome by the following underground methods, but here again the structural features of the rock constitute the controlling factors governing the feasibility of such projects. If the rock is badly broken up by many intersecting joints underground methods may not be possible, for slate is too cheap a commodity to justify expensive timbering. If on the other hand, the beds overlying the good slate are sound and strong, tunneling may be conducted in safety, if pillars of slate are left at intervals for roof support. A mining method has been pursued with success at West Pawlet, Vermont, for in this deposit the rock structures are advantageous. A series of parallel vertical joint planes approximately 30 feet apart provide walls for 6 steeply inclined shafts, following the bed, with 30-foot supporting pillars of undisturbed slate between them. The cost of sinking shafts is therefore relatively low where open joints may be utilized to take the place of wall cuts. All rock structures should receive very careful attention in working out the most logical plan of development.

The slaty cleavage in many regions governs the inclination of the quarry floor. Where it is horizontal or inclined at a moderate angle the floor is maintained parallel with it. In some quarries the floor is inclined at an angle as high as 45 degrees to conform with the dip of the cleavage. At Monson, Maine, and Delta, Pennsylvania the slaty cleavage is vertical, and the quarry floor follows open horizontal seams.

Open bedding planes, (termed "loose ribbons" by quarrymen) or open joints are of great assistance in the removal of the rock, for they may be utilized to take the place of channel cuts, or fractures made by wedging or blasting. The experienced quarryman utilizes such natural planes wherever possible. In some of the tunnels and drifts at Monson, Maine, the ceilings formed by horizontal joint planes are as smooth and uniform as the ceilling of a room in a dwelling house. It is commonly found that horizontal joints occur at intervals of 6 to 14 feet, and in best quarry practice the channel cuts are projected always to the level of the seam, thus utilizing it as a bench floor.

The "grain" of slate is another structural feature that has a definite influence on quarry methods. The term "grain" is applied to a second direction of splitting, less pronounced than the slaty cleavage, and usually approximately at right angles to it. Major vertical fractures are always made in the grain direction, and attempt to force a fracture in a direction inclined to the grain would result in excessive waste. In some qarries near Pen Argyl, Pa. the three important structural features, bedding, (marked out by "ribbons") slaty cleavage, and grain approximate the three dimensions of space, the ribbon and grain being vertical and approximately at right angles to each other, and the slaty cleavage horizontal or inclined at a low angle. By quarrying always in conformity with these structures the best quality of product is obtained, and the proportion of waste is always greatly reduced.

To the quarryman, monument manufacturer and paving stone cutter the rift or direction of easy splitting in granite is similarly a structural feature upon which the success of his operations is largely dependent. The origin and nature of rift in granite are little understood, and it is probable that a thorough petrographic study would open the way to more efficient methods of quarrying and dressing the rock.

These are but a few of the simpler examples of rock structures that play an important part in economic problems of quarrying and mining of the non-metallics. It is apparent to any careful observer that great improvement in method could be brought about by a better understanding of rock structures. There is, therefore, in the vast field of the non-metallics an opportunity for the geologist and engineer to render practical service of inestimable value, in solving structural problems, and in pointing out the influence of rock structures on methods of operation.

DIRE DEVELOPMENTS IN GOLD INDUSTRY!

BY ALEXANDER GRAY.

"Cheer up! The worst is yet to come!"

The only consolation in sight for producers is that Edison and his contemporary collaborators are going to have competition when they come to patenting synthetic gold processes. To that extent the sun may rise blood red for gold mine owners and set suspiciously for some of them.

A valorous British officer who saw service in the fever belt in the Cameroons (somewhere around there) veraciously has vouchsafed that he saw a West African umfaan (a native youth) transmute metals, make gold, and he bought specimen nuggets, lest there be those who would scoff at him.

The nuggets were put through "while you wait", according to the martial narrator, who disclaims being a romancer, and who chides the world-famed metallurgical highbrows for their vaunted pre-eminence and pre-disposition to lay the flattering unction to their exclusive selves that they know it all.

Crude utensils, perhaps the commonplace kaffir pot so revered by those of us who used to cherish it as the chief factor in our commissariat, may-be a daub oven and admixtures of snake juice and weird invocations accompanied by violent gymnastics with assegais and shields, are alleged to have been the formulas. The British officer did not say this but no kaffir would undertake feats without those concomitants and the right temperature, of course, irrespective of the undertaking on the part of the Dutch Government that it will restrict the traffic in strong liquor on the West

Coast. Anyhow, the demonstration netted the dusky son-of-a-sea-cook enough gold to start something in the nuttery of the Staff Captain.

No wonder the home-brewed gold bullion stirred up the valiant eye-witness and prompted him to write about it to the press of two continents. He did this as an act of kindness to holders of gold-secured bonds, of gold-backed paper everywhere, because the Arcadian alchemist is daily or weekly transmuting metals, when he is not making snuff or resting while his umfazi-wife or wives, is or are emulating the Man With the Hoe.

Nor was the bullion wrought out of nothingness in value, of the amber two-per-cent. variety. Not at all. It was superfine; that was why the Military Observer purchased some of it and brought it to London.

Therefore, why not yield prirority to wonder-working kaffir! Generally it has been the experience that the "raw" kaffir preferred his "Bass's"-master's-pantaloons, shirtts, or shoes, when he contemplated reposeful sojourns at his kraal. Occasionally he is an adept artisan, but concocting charges for primitive retorts and practically proving that he is a synthetic conjurer with the crucible is worth this space and what sugar and limbo-colored cotton it must have cost the Staff Officer, if for no other reason than to satisfy the audience that all the "nuts" are not in Brazil.

Once I depleted my surplus visibilities on a missionary "culled" man who exhorted his racial affinities to flee from the wrath to come. He vociferously volunteered to illustrate his divine attributes by turning water into wine. His thirsty compatriots found their patience exhausted at the expiration of a week. The synthetic invigorant did not arrive. It is said to have been otherwise in this matter of jungle gold that really jingled. Consequently Messrs Edison and Ford have a better thing in the offing than Muscle Shoals nitrates if we are to have solid gold jitneys at the price of a thousand or two cowrie shells. However, they should worry!

It is a coindence that this revelation should become public property simultaneously with Mr. Edison's grim forebodings as to the future unworthiness of gold. Beyond that, there is no analogy between the event that accompanying the prospecting of a farm in what was then the Orange Free State. The Boer farmer who would not admit that he had either diamonds or gold on his place, has yet to be discovered. So, when three alert prospectors came along and put the question whether there were any diamonds about, the vrouw, simple soul that she was! modestly affirmed, and was not sworn to it. Consequently an option was granted, conditioned on a small cash payment and work being done. Upon returning with a testing plant, a promising area was located and in due course a diamond found. Efforts were redoubled and another diamond turned up on the sorting table. To the trio it looked like a sure enough diamond mine. The vrouw blandly congratulated the embryo magnates and accepted cash for the provender essential for their daily sustenance. Washing operations proceeded with increasing alacrity. Weeks elapsed. The operators exhibited their two "finds" but were obliged to hold them and give them to the owners of the farm in case the work was abandoned. Working capital became perilously scarce. Finally no other diamonds having been recovered and being without funds, the trio decided to forego the option. When they sought the vrouw and tendered to her the two stones with the explanation that the results were disappointing, she waxed indignant and indiscreetly exclaimed:

"You lie! Where is the other diamond?"

She had "salted" the thing by planting three stones and she thought there was a "hold out" as to the missing one.

Really, though, the West Coast nuggets may have been indigenous, and if so, they are less deceptive than those kaffir curios acquired by English tourists as barbaric emblems, whereas they were made in Birmingham or Sheffield.

PATENT FOR MINE FILLING

Dr. Adolph Goebl, 6,535 Lorain Ave, Cleveland, Ohio, has patented in the United States a process for filling underground excavations with sand. The material is mixed with water and carried down in pipes.

REDUCTION OF DOME'S CAPITAL STOCK.

The bold move being made by the management of the Dome Mines towards the redemption of the capital stock during the life of the mine has an interest that is not only local, but will set talking the world of miners and investors in mines. It has long been an axiom to mine managers that the investment must be returned, along with interest, by the time the ore-deposits have been worked out. When the return of capital investment is made as additional dividends, the rate seems large as compared with the dividends from other investments, and the average investor is prone to labour under a delusion as to his actual rate of return. The commendable action of the Dome officials in adopting a means that will help to clear away this misunderstanding, and consequently aid the investing public to gauge more correctly the value of mining shares, may prove to be epoch-making in the the history of investment in mines. The following news item gives particulars of the move.

"A special general meeting of the shareholders of the Dome Mines Company, Limited, will be held on Saturday, February 11, for the purpose of ratifying recent by-laws passed by the directors. One of the by-laws deals with the capital return of the stock, and is for the purpose of authorizing the directors from time to time, as they see fit, to pay out of capital such sum or sums as deemed advisable all such payments to be made pro rata among all shareholders, and a due proportionate amount to be set aside to provide in the same way for shares now allotted but not issued, and to be paid as and when such shares are issued to the holders.

"The second by-law will empower the directors to make application from time to time to the Lieutenant-Governor-in-Council of the province of Ontario for supplementary letters patent decreasing the par value of the shares of the company issued and allotted by the amounts so to be repaid out of capital account of each share.

"The desire is to decrease the capital stock from the sum of $5,000,000 to the sum of $1,000,000 and authorize the repayment to the shareholders of the sum of $176,615, and reduce the par value of the shares of the capital stock from $10 to $2 per share."

At Latrobe, in Tasmania, there are extensive beds of oil shale with a promising content of gas and oil. More than one commercial plant to treat the shale is mooted.

Northern Ontario Letter

THE SILVER MINES

With the end of the current winter coming reasonably close, and with general conditions in connection with mining in this country showing a steady improvement, there is a feeling in Cobalt that the slack period of the past few months may soon give place to a quite general revival of activity in many of the smaller mines.

Crown Reserve

The Crown Reserve has encountered even better encouragement in diamond drill work on its property in the Larder Lake district than was the case in surface work. Whereas surface assays showed a gold content of around $1 per ton in gold, it is understood the core from one of the diamond drill holes showed gold values of nearly double that amount across a good stoping width. The proposition is considered to be well worth opening up by shaft sinking to a depth of 300 or 400 feet and toward this end the Crown Reserve is removing part of its machinery from its old Cobalt property to the new scene of activity.

Larder Iake

While the Crown Reserve is thus carrying out its plans for aggressive work, the Coniagas and the Canadian Associated Goldfields are both carrying on exploration work. Diamond drill results on the Costello property of the Goldfields were not altogether reassuring, but the result of shaft sinking has at least been encouraging. It is learned that the Coniagas this week took under consideration another property in this district.

Haileybury Frontier

Roads to South Lorrain have not been very good during the past couple of weeks on account of heavy wind having caused the snow to drift. However, the Mining Corporation has been making good progress in the work of taking machinery from its old Cobalt Lake property to the Haileybury Frontier, the latter of which is held under working option. The electric hoist is already in operation. In view of the attention of the Mining Corporation being directed largely to the exploration of the area on the Frontier through which the main break from the Keeley is expected to pass, this work is looked upon as being highly important from the point of view of all property holders in the South Lorrain district.

Coniagas

Although the cold weather caused the Coniagas to curtail that branch of operations dealing with the re-treatment of sand tailings lying on surface, yet the general operations are continuing at full blast and all signs point toward 1922 being another prosperous year for this company.

Genesee

Arrangements will be made to resume operations on the Genesee property at Cobalt. At a recent meeting, the directors decided to authorize the sale of a certain block of treasury shares and in this manner to endeavor to secure the necessary money to pay for continuing cross-cutting operations at the lower level.

Trethewey

At a recent meeting of the shareholders of the Trethewey-Cobalt, a by-law was passed, authorizing the incorporation of a new company on the basis recently outlined in the Journal. The new company, known as the Castle-Trethewey will assume all the liabilities of the Trethewey as well as the assets and will pay the Trethewey 400,000 shares. The shareholders of the vendor company will be given the right to subscribe pro rata for the balance of 1,600,000 shares at 10 cents per share. Thirty days were allowed within which to subscribe for the treasury shares, and it is believed the result will be that sufficient money will be raised to quickly pay off the indebtedness of around $40,000 as well as provide working capital.

Triangle Silver

Captain Jeffries is busily engaged in an effort to arrange the affairs of the Triangle Silver Mines Company so as to resume work this winter or in the early spring. It is stated that prospects are good for the finances being raised within the next few weeks.

White Reserve

J. A. McAndrews of the White Reserve Mine is on a visit to the property, having gone in to the Maple Mountain district by way of Elk Lake. No work is being done at present.

Cable regulations

Regulations in connection with cable used in mine hoisting will go into effect at various dates during the first half of 1922 as shown in the following summary received from the Department:

Testing Hoisting Cables.

Rule 68, Section 164, of the Mining Amendment Act 1919, being Part IX of the Mining Act of Ontario, is as follows:

"Testing portion of rope.

(68) At least once in every six months the hoisting rope shall have a portion not less than six feet in length cut off the lower end. With the exception of the cutting at the end of the first six months the length so cut off shall have the ends adequately fastened with binding wire to prevent the disturbance of the strands and shall be sent to a reliable testing laboratory for a breaking test. The certificate of such test shall be kept on file. This rule shall not come into effect until proclaimed by the Lieutenant-Governor in Council.

Copy of an order-in-Council, approved by His Honour the Lieutenant-Governor, dated the 9th day of November, A. D. 1921.

Upon the Recommendation of the Honourable the Minister of Mines, the Committee of Council advise that Your Honour may be pleased to issue a Proclamation bringing into force Rule 68, as laid down by Section 164 of the Mining Act of Ontario as enacted by the Mining Amendment Act, 1919, Section 13, with regard to the testing of hoisting ropes or cables in mines as follows:

In the Mining Divisions of Kenora, Fort Frances, Kowkash and Port Arthur, on the first day of January, 1922:

In the Mining Divisions of Sault Ste. Marie, Sudbury and Parry Sound, on the first day of February, 1922;

In the Mining Divisions of Temiskaming, Coleman, Montreal River and Gowganda, on the first day of March, 1922;

In the Porcupine Mining Division, on the first day of April, 1922;

In the Larder Lake Mining Division, on the first day of May, 1922;

And in all other parts of the Province, on the first day of June, 1922.

THE GOLD MINES.

Will Develop Power at Sturgeon Falls.

While it was officially stated some time ago that the McIntyre Porcupine had prepared estimates in connection with developing about 7,000 h. p. at Sturgeon Falls on the Mattagami River, but that the company would be willing to step aside and permit power company officials to take up the project, yet it was reported unofficially a week ago that the McIntyre might go ahead with the work on its own account. This report was quickly followed by another that the McIntyre had sold its rights to the power site to the Northern Canada Power Company. It is now understood that the development of this energy will likely be commenced by the power company soon after the outcome is known of the recent litigation between the Hollinger Consolidated Mines and the Northern Canada Power Company.

Dome Mines

The best news coming this week from the gold fields of Northern Ontario has to do with achievements at the Dome Mines where the amount of gold being recovered per ton during the first three weeks of the current month was actually higher than any other mine in the Porcupine district. Those in close touch with the situation believe the Dome will experience no difficulty in realizing net profits of $125,000 per month, or at the rate of over 31 p.c. on the company's issued capital. Among the more optimistic are those who believe there will be no difficulty in making net profits of $150,000 monthly, or at the rate of between 35 and 40 p.c. yearly. The reason for the recent increase in mill heads is that by a sleight change in milling practice it has been found that the plant makes an excellent recovery when dealing with more high grade ore than had previously been treated satisfactorily. The first capital return of $1.00 per share on April 20th, plus the regular dividends of 2½ p.c. quarterly assures the stockholders of returns of 20 p.c. this year, and with good prospects of the fiscal year beginning with the end of March being marked by the payment of a second capital reduction of $1.00 per share, or a total of 30 p.c. for the period.

Paymaster

It is stated in Porcupine that Dr. Walter Harvey Weed, well known United States geologist, who recently visited the Paymaster mine was favorably impressed with what he saw and recommended that the shaft be continued to deeper levels. It was announced recently in the Journal that the work of continuing the shaft to a depth of 100 feet is already under way.

Teck-Hughes

In an official statement to the representative of the Journal D. L. H. Forbes, general superintendent declares that gold tellurides were encountered during November and December on the 600 ft. level of the mine and this resulted in a big increase in production. Mr. Forbes presented figures to show that mill heads during the last half of December averaged about $21 to the ton and the mine produced about $32,000 for that period. The figures also show that mill heads during the first half of January averaged upwards of $17 per ton and resulted in an output of over $20,000 for the period of 15 days. These mill heads were the result of taking from 15 to 25 tons of rich ore along with not far under 100 tons of the ore of regular grade from other parts of the mine. It is now planned to carry the shaft to a depth of 980 feet and open up levels down to that depth. In the meantime, no stoping will be undertaken at the 600-ft. level in the new ore until work on the lower levels is under way.

Kirkland Lake Proprietary

In an official statement issued in connection with the Kirkland Lake Proprietary (1919) Ltd., some interesting details are given in connection with the properties held by this company. One outstanding feature of the report is that a total of 56,000 pounds or approximately $250,000 has been borrowed with which to finance the work of again placing the properties in condition to resume production. Another feature is that the present plans are to re-open the mill in April and place the enterprise on a profitable producing basis, this being assured by the volume of good ore already in sight.

Bidgood

Official advice to the Journal that the vein at the 400 ft. level of the Bidgood Gold Mines carries about eight feet in width of good ore has caused a general wave of optimism in regard to properties in this eastern part of the Kirkland Lake district.

Goldfields

Information from the Larder Lake field shows that the Canadian Associated Goldfields has met with encouragement during the course of shaft sinking, while the Crown Reserve, as stated elsewhere in this summary, has indicated the presence of commercial ore at depth by use of diamond drills.

Power rights

Late reports from Porcupine, totally unconfirmed at the time of writing, have it that the Hollinger Consolidated has at last secured the right to develop hydro electric energy on the Abitibi River.

Lake Shore.

Lake Shore again set a new high record during December according to the regular monthly report for December. It had been unofficially stated recently that the December record has reached $57,000 which would have been the highest record in the history of the mine, but the official statement just received shows a production of $70,851.37 thereby far exceeding any previous month.

The mill treated an average of close to 65 tons a day daily in spite of having been in operation only 90.15 of the possible running time, while the average gold content of the ore was $35.35. This compares with a former average of about $25 a ton and a former high average for one month of a little over $30. The achievement is one of the latest sensations in connection with mining in the Kirkland Lake district.

NEW ORE BODY STRUCK.

Premier Mine at Stewart, B. C., Value at $80,000,000

Victoria, B.C.—Striking of a large new body of ore in the famous Premier mine at Stewart, B.C., has increased the value of the property to $80,000,000 according to a message received here from Stewart. Officials at the Department of Mines express surprise at the estimate. It has been known officially for some time that the company had $10,000,000 actually in sight before undertaking recent explorations.

The Guggenheims and President W. B. Wallace of the Crow's Nest Pass Coal Company control the mine which is now believed to be the richest silver and gold mine in North America.

Oil Exploration

By ALEXANDER GRAY.

Whether it be deep-seated prejudice against whatever has to do with the development of mineral resources, or a wide-spread suspicion that the exploitation of mineral deposits is surcharged with what Pandora turned loose, it is immutable that the remarks of President Stillman at the annual meeting of the Imperial Oil Company evoked neither commendation nor apprehension lest Canada fail to disclose oil fields comparable with those over the border. Perhaps the silence is due to embarrassment due to an indisposition to advertise the disappointments met with during two years of activity in the quest for oil in the west and northwest. May be the degree of indifference synchronizes with the abstention of all but the Imperial company among the great interests in the industry, from extensive operations in the endeavor to find oil. Whatever the reason for the negative public attitude toward a domestic supply of oil, it is not impertinent to quote a few of Mr. Stillman's salient sentences.

"It is desirable to round out our organization by procuring a domestic production of petroleum. Dependence upon foreign sources of supply for crude has caused great anxiety in the past, especially during the war, but the company's relation with other large producing companies in the United States has enabled it be obtain a continuous and sufficient supply.

"While this is reassuring when we contemplate any possible recurrence of such a shortage in the future, there exist many disadvantages in the fact that we are forced to import about 98 per cent. of our raw material. High freights are, of course, the most important of these, but in addition to this, we have been heavily penalized in the past two years by the depreciation in Canadian exchange. In order to buy funds with which to pay for our raw material abroad our expenditure in the past year has been about four million dollars, or an amount almost equal to that paid out in dividends. It is for these reasons and because we have felt that a moral responsibility rested upon us as a semi-public service corporation, that we have endeavored to develop a production of petroleum in this country, and we have considered our operations in the Canadian West and elsewhere, while entered upon primarily for the benefit of our shareholders, as partaking of the nature of a National Work."

Frankly stated, the Imperial Oil chief broadly defined the purposes and duty of this corporation. Evidently the conception of that duty was put into execution before the Imperial company executive officers talked about it, beyond an occasional note of optimism. As a further reason why a wholly home-made oil industry should be a national institution, Mr. Stillman also dealt with economic conditions as affecting marketing operations which, he said, had resulted very much more satisfactorily than they expected six months ago. "In all my forty years connection with the oil industry", he avowed, "I do not recall a period in which occurred more drastic readjustment of values, more rapid variation in conditions, nor which called for more courage and resource that the year 1921." Notwithstanding which there was a display of optimism in the provision of tankers and tank cars, the erection of more refineries, and of sporting spirit in the exploration campaign throughout the Northwest, the cost of which is unstated, but which was entered into as a "national work."

Those who can smile when combined conditions are so perverse are not to be deterred. That the volume of business transacted had been "fairly well maintained" while fluctuations in the price of crude were too volatile to be otherwise than "trying" and exchange and freight constituted onerous surcharges, sustains the complimentary remarks of Wallace Nesbitt, K.C., to the effect that it is fortunate to have experienced experts departmentally in charge and directors who are not culpably perfunctory. Mr. Stillman, however, who was buoyant last year as to the outlook for a domestic supply of oil, left it to Vice-President Victor Ross guardedly to describe in more or less detail the nature and extent of the National Field Work performed by the company. Feeling, no doubt, that pessimism is no part of the Imperial programme, Mr. Ross made the best of a thus far unprofitable experience. Whereas hope had run high that the Fort Norman Discovery Well was the harbinger of greater developments to Canada, Mr. Ross deftly disposed of that phase of his subject by stating:

"It is not to be expected that anything further will be heard of the Fort Norman operations until the Spring, and it may be years before results of commercial value are found there."

From this there is no other deduction than that the cause of the furore on the Mackenzie river has not proved commercially attractive. About three barrels daily instead of the estimated flow when the first well was brought in subscribers more romance than reality to what has transpired, even though the intimation that the last word has not been written about the section lends too remote a factor of affirmative expectation. As it is a year and a half since the Fort Norman development seemed to confirm horizontal assumptions that petroliferous areas were as broad as the prairies, and then the foot-hill and Pacific slope country might have a shade the best of it, the inferences conveyed by Mr. Ross suggest that the National Work of finding oil be undertaken by others as well as the Imperial Oil Company whose millions are being expended for their individual benefit and for patriotic purposes.

Between the Montana boundary and the Arctic Circle, not counting those in the Fort Norman district, four wells were abandoned during the past year and fourteen are in various stages of progress. Mr. Ross did not specify the discarded sections. Some of them were in eastern Alberta, western Saskatchewan, and at Great Slave Lake, one was at Twin Butte, in southern Alberta, when a depth of 3,975 feet was attained. Territory so expansive and the non-participation of other important oil interests, left the Imperial company to its own resources, practically unaided. That some of the fourteen wells now proceeding are "regarded as fairly promising", according to Mr. Ross, precludes final judgment and provides an argument for immediate co-operation by the Dominion Government in order to hasten the proving process. Abandonment of the Czar-Monitor section; discouragement at Great Slave Lake; stopping of the work at almost 4,000 feet at Twin Butte, where great depth in any event would necessitate greater production than ever was obtained in Southern Alberta, make imperative a round-table conference at Ottawa and a revision of National Policy. At Pouce Coupe a 10,000,000 feet daily flow of gas for which there is no market, is substantial inducement for the continuation of drilling, although there is a plenitude of oil and a paucity of gas in the Irma section. However, Pouce

Coupe has possibilities, and the irony of it is that President Smith of the subsidiary International Petroleum Company reports that production has increased in Peru while Colombia prospects are brightening.

So, with Canada providing only two per cent. of its domestic requirements, and a tone of interrogation permeating the official utterances of Imperial company executives, it devolves upon those with vision large enough, to give more momentum to aggressive explorations. The scope of this National Work is altogether too narrow as at present conducted. Directed by Imperial experts there is maximum efficiency and heavy outlays upon field forces and equipment, and, until lately, a disposition to interpose impediments. That the testing of Canadian petroliferous areas will require years of unremitting effort, is more generally appreciated. The cost of the Fort Norman Well is not to be considered as a criterion. Otherwise it would take a century or two to reimburse the Imperial company, even though the production become marketable. Recent advices are that very promising areas are offering themselves in the Far Northwest. Pouce Coupe is accepted upon approval. Southern Alberta and Saskatchewan call for intensive drilling to depths which must yield oil commensurate with the cost of the wells. In our National prospectus wells are no less vital to Canada and its internal economies than the Wilsonian "points" were as the basis of international amity.

Messrs. Stillman, Smith and Ross have not overstated the situation. Canada is little better off in the matter of a domestic supply of oil than it is in regard to the supply of iron ores to its furnaces; and means must be devised whereby more Canadian coals will find home markets. Imperial Oil officials do not despair of developing Canadian oil fields. They cannot offhand do all the necessary exploring in a great expanse of territory. It is contrary to the scientific conception of the geological ages as they are revealed or believed to be represented that huge deposits of iron ore and the large reservoirs containing oil stopped at the border.

Thus far it has not been demonstrated that the states of Wisconsin, Minnesota, Montana, North Dakota and Oregon have proved or possible oil areas comparable with those of Wyoming or Colorado. At the lower end of the great lakes, Ohio, Pennsylvania and New York led in the development of the American oil industry which in 1920, as Mr. Victor Ross stated in his "Evolution of the Oil Industry", then represented an aggregate investment in the production, transportation, refining and distribution of petroleum and its products of $7,310,000,000. What really began in Pennsylvania in the fifties of the past century, and spread over the adjoining states, eventually including over forty states resulted in 1919 in a total production of 377,000,000 barrels of crude oil, besides which 50,000,000 barrels were imported, mostly from Mexico. Toward the immensity of the oil industry, states adjacent to our border-ing upon Canada have contributed in large measure. Washington Geological Survey experts last week reported the following as the remaining estimated supply:

	Millions of Barrels
New York	100
Pennsylvania	250
West Virginia	200
Ohio	190
Indiana and Michigan	70
Illinois	110
Kentucky, Tennessee, Northern Alabama and Northeastern Mississippi	175
Missouri, Iowa, North Dakota, Wisconsin and Minnesota	40
Kansas	425
Oklahoma	1,340
Northern Louisiana and Arkansas	525
Texas except Gulf Coast	670
Gulf Coast Texas and Louisiana	2,100
Colorado, New Mexico and Arizona	50
Wyoming	520
Montana, Nebraska and South Dakota	100
Utah, Nevada, Oregon, Washington and Idaho	80
California	1,350
Eastern Gulf, Coastal Plain and Artlantic Coast States	10
Total	9450

As annual production by the States now is nearly 500,000,000 barrels, and "annual consumption already well beyond the half billion mark", the conclusion of the American scientists who have canvassed the situation is, that the assured American supply is sufficient for twenty years, provided it can be recovered as fast as wanted. That other fields will be discovered, is not doubted, and the Director of the Geological Survey has this by way of further explanation:

"The estimates of oil in 'possible' territory, are absolutely speculative and hazardous, and that, although they represent the best judgment of the geologists, they nevertheless may be, at least in part, wildly erroneous. The questions involved are not only how much a particularly doubtful region will yield, but whether it will furnish any oil whatever.

"On the whole, the estimates are undoubtedly the best that have ever been made for the United States, and better than have hitherto been prepared for any oil country or district of the world.

"Of the total estimated oil reserves of the United States amounting in round numbers to 9,000,000,000 barrels, 5,000,000,000 barrels may be classified as oil in sight and 4,000,000,000 barrels as prospective and possible. Rather more than 1,000,000,000 barrels should be assigned to the heavy oil group. These oils will be recovered mainly in the Pacific Coast, Rocky Mountain and Gulf States. The contents of the Lima-Indiana region, which yields oil of a distinctive type, are estimated at 10,000,000 barrels. In general, the so-called paraffin oils are more pure and high grade, as contrasted with the heavier oils, amount in all to about 5,000,000,000 barrels. The estimated reserves of high grade oils of the Appalachian States are about 725,000,000 barrels.

"These original reserves are enough to satisfy the present requirements of the United States for only twenty years if the oil could be taken out of the ground as fast as wanted. Should these estimates fall even so far as 2,000,000,000 barrels short of the actual recovery, that error of 22 per cent. would be equivalent to but four years' supply at [illegible] consumption of the

However, the [illegible] estimates [illegible] the [illegible] reserves [illegible] to be sufficient to meet the needs of the country at the present rate of consumption for [illegible] years. Therefore the reserves will be exhausted at the end of that time or at most a few years later. The assumption is based on exploration for the oil made still not all the [illegible] found within one hundred feet of the surface will be gotten [illegible] many come to the [illegible] are found, and the [illegible] connected [illegible] summed dry as quickly."

Whatever [illegible] entered into the estimates of the [illegible] of all the States, the Director of the Geological Survey [illegible] to reassure the country that not

all of the nine billion barrels or more may be discovered, must be less produced, within the specified twenty years. Meanwhile the "independence" of the States is assured and the life of the domestic supply will be prolonged "if foreign oil can be procured". Failing the latter, it is admitted that American "dependence is sure to grow greater and greater as our own fields wane, except as artificial petroleum may be produced by the distillation of oil shales and coals or some substitute for petroleum may be discovered"

Of the likelihood of improved methods of recovering additional oil from the ground, it is prudently held that this is contingent upon so many factors that further forecasts "would probably contain errors enormously greater than those inherent in the estimates made on the basis of methods now in use"; because it is only in northwestern Pennsylvania and southwestern New York that geologic conditions are so well known, and the experience with improved methods on a commercial basis so extensive, as to justify the formulation of estimates based on the results obtained.

Urging that the Government at Washington give most serious study to the more complete extraction of the oil from the ground, as well as to the avoidance of waste, either through direct losses or through misuse of crude oil or its products, the signatories to this compendium have made clearer the full import of Mr. Stillman's statement about Canada's "dependence upon foreign sources of supply for crude oil". Knowing the producing and consuming capacity of the United States, and having foreknowledge of what is going to happen if the United States derives no supplemental supplies from Mexico and elsewhere throughout the next twenty or twenty-five years, Imperial Oil subsidiaries are busy in Central and South American areas; the parent company in Canada is spending more than is admitted in the search for domestic oil, and the Standard of New Jersey and Indiana are conducting world-wide operations.

Canada is singularly remiss in its appreciation of the urgency of this National Work. Interest is confined to those who hold millions of acres on the off-chance that the other fellow will prove up something. Three barrels per day is the grand aggregate of actual new production. It may take years to locate a field such as the midwest, of a half dozen square miles, if there are not many more to be had, that will be of "commercial value", yet in the meaning of Mr. Ross. At this writing those who know most about their National Work and its probable results, may be in doubt as to whether they are courageous or foolhardy, yet they have that twenty year finding of Washington experts confronting them and even Columbia and Peru are not despicable as lines of industrial defence.

All the eligible country held by the Government and the railroad systems make a respectable "jackpot" for a high stakes game.

CORRESPONDENCE

Our Mineral Resources.

To the Editor, Canadian Mining Journal:

Sir,—

In an editorial in your issue of Dec. 9th you stated: "Canada's known and ascertained mineral wealth is large. Her potential wealth of this character is possibly, judged by the standards to which we are accustomed, almost illimitable."

It seems almost impossible these days to pick up a paper without reading something extravagant in regard to the mineral resources of our Dominion. There is some excuse for this in the daily papers, whose writers are in the same class with the public, which considers a mountain synonymous with mineral wealth, but in the Canadian National Mining Journal the facts should be set out with becoming moderation.

While our mineral wealth may be "huge" when compared with the reserves available at Confederation it can hardly be considered so when the amount of prospecting that has been done since then and the size of the country covered is considered. Compared with the United States, a country of similar size, our reserves show up rather poorly. Why protest against the boom language of the promoter when you use such words as "illimitable" to describe resources which are, from the evidence that has been piled up, extremely limited?

I would like to draw your attention to a few points not generally considered. In British Columbia we have a continuation of the ranges that have produced the great ore-bodies in the United States. British Columbia was for many years advertised as "The Mineral Province of Canada" and it is only natural that it should occupy that pre-eminent position. It has been the home of numberless prospectors and the operating ground of numerous capable and enterprising mining companies. Its mineral districts have been examined in detail by hundreds of engineers, some of them representing these companies and others representing capital in different parts of the world. It has produced many million tons of ore and if there is one place in the Dominion where there should be "illimitable" mineral wealth that place is the Province of British Columbia.

Do you know, Sir, that in this province, during the past quarter of a century, there has not been one solitary discovery of ore of outstanding importance?

There are only two areas in British Columbia that have produced mines of this class. One is the strip along the southern boundary and the other is the strip along the coast. The main line of the C. P. R. has been in operation since 1886 and has never tapped anything worth while. There are not only no large mines along the Canadian Northern main line, the Grand Trunk Pacific main line, the Pacific Great Eastern or the Interior Waterways, but the mines of any kind in the areas covered by these routes are almost negligible and yet these railways and waterways block out the greater part of the province.

* * *

The chief point I wish to make however, is that it does not take long to go over the outcrops in a district and the important deposits are soon located. After that it is only a question of determining the size of the big mines when the date of the wind-up can be approximately arrived at. It can, in fact, be stated as a law, and doubtless has been, that the mines in any district are all located within a very brief period.

* * *

The first fifty years of our national life has been the period of Exploration and Discovery of our mineral resources over our accessible areas. It has also been the period of Consumption of a large amount of them. A very large area of country has been covered and the outcrops examined. In the best areas much intensive work has been done in the way of trenching and diamond drilling. The result has been that the total of our ore reserves is far from commensurate with the important position we would like Canada to take in the world and this should be a matter of alarm and consideration rather than misrepresentation.

Doubtless there will be, due to the covering of recent

The Canadian Miners' Buying Directory.

Acetylene Gas:
Canada Carbide Company, Ltd
Prest-O-Lite Co. of Canada, Ltd

Acetylene Welding:
The Toronto Iron Works, Ltd.

A.C. Units:
Powley & Townsley, Limited.

Agitators:
The Dorr Co.
Can. Chicago Bridge & Iron Co., Ltd.
Horton Steel Works, Limited.

Air Compressors:
Bellliss & Morcom, Ltd.
Laurie & Lamb

Air Hoists:
Canadian Ingersoll-Rand Co., Ltd
Mussens, Limited.

Air Receivers:
The Toronto Iron Works, Ltd.

Alloy and Carbon Tool Steel:
Peacock Brothers Limited.

Alternators:
MacGovern & Co

Aluminium:
Spielman Agencies, Regd.

Amalgamators:
Northern Canada Supply Co.
Mine and Smelter Supply Co
Wabi Iron Works.

Antimony:
Canada Metal Co.

Antimonial Lead:
Pennsylvania Smelting Co

Assayers' and Chemists' Supplies:
Dominion Engineering & Inspection C...
Lymans, Limited
Mine & Smelter Supply Co.
Pennsylvania Smelting Co.
Stanley, W. F. & Co., Ltd.

Ash Conveyors:
Canadian Link-Belt Company

Ashes Handling Machinery:
Canadian Link-Belt Co., Ltd

Assayers and Chemists:
Milton L. Hersey Co., Ltd
Campbell & Deyell
Ledoux & Co.
Thos. Heyn & Son
C. L. Constant Co.

Asbestos:
Everitt & Co

Balls:
Hull Iron & Steel Foundries, Ltd
Peacock Brothers Limited.
The Wabi Iron Works.
The Hardinge Conical Mill Co
The William Kennedy & Sons, Ltd.

Ball Mills:
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd
The Wabi Iron Works.
The William Kennedy & Sons, Ltd

Babbit Metals:
Canada Metal Co.
Hoyt Metal Co.

Ball Mill Feeders:
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd

Ball Mill Linings:
Hardinge Conical Mill Co
The William Kennedy & Sons, Ltd
Peacock Brothers, Limited
Hull Iron & Steel Foundries, Ltd

Belting—Leather, Rubber and Cotton:
Canadian Link-Belt Co., Ltd.
The Mine & Smelter Supply Co
Northern Canada Supply Co
Jones & Glasco.

Belting:
R. T. Gilman & Co
Gutta Percha & Rubber, Ltd

Belting—Silent Chain:
Canadian Link-Belt Co., Ltd
Hans Renold of Canada, Limited, Montreal.
Jones & Glassco (Regd.)

Belting (Transmission):
Goodyear Tire & Rubber Co

Belting (Elevator):
Goodyear Tire & Rubber Co

Belting (Conveyor):
Goodyear Tire & Rubber Co
Gutta Percha & Rubber, Ltd

Bins and Hoppers:
The Toronto Iron Works, Ltd.
Can. Chicago Bridge & Iron Co., Ltd.
Horton Steel Works, Limited.

Blasting Batteries and Supplies:
Canadian Ingersoll-Rand Co., Ltd
Mussens, Ltd.
Canadian Explosives, Ltd.
Powley & Townsley, Limited.

Bluestone:
The Consolidated Mining & Smelting Co
The Conlagas Reduction Co., Ltd.

Blowers:
Canadian Fairbanks-Morse Co., Ltd
Northern Canada Supply Co.

Boilers:
Canadian Ingersoll-Rand Co., Ltd
Marsh Engineering Works
R. T. Gilman & Co.
The John Inglis Company
Wabi Iron Works.

...ue Vitriol (Conlagas Red):
Canadian Fairbanks-Morse Co., Ltd.

Bortz and Carbons:
Diamond Drill Carbon Co.

Boxes, Cable Junction:
Standard Underground Cable Co. of Canada, Ltd
Northern Electric Co., Ltd.

Brazilian Rough Diamonds:
Diamond Drill Carbon Co.

Brazilian Mica:
Diamond Drill Carbon Co.

Buggies, Mine Car (Steel)
Hendrick Manufacturing Co

Brazilian Ballas:
Diamond Drill Carbon Co.

Brazilian Rock Crystal:
Diamond Drill Carbon Co.

Brazilian Tourmalines:
Diamond Drill Carbon Co

Brazilian Aquamarines:
Diamond Drill Carbon Co.

Bridges—Man Trolley and Rope Operated—Material Handling:
Canadian Mead-Morrison Co., Limited

Bronze, Manganese, Perforated and Plain:
Hendrick Manufacturing Co.

Buckets:
Canadian Ingersoll-Rand Co., Ltd
R. T. Gilman & Co.
Hendrick Manufacturing Co
Canadian Link-Belt Co., Ltd
Marsh Engineering Works
Mussens, Ltd.
MacKinnon Steel Co., Ltd
Northern Canada Supply Co.
The Wabi Iron Works

Buckets, Elevator:
Canadian Link-Belt Co., Ltd
Hendrick Mfg. Co.
Peacock Brothers Limited

Cable—Aerial and Underground:
Canada Wire & Cable Co.
Northern Canada Supply Co
Standard Underground Cable Co. of Canada, Ltd
Peacock Brothers, Limited

Cableways:
Canadian Mead-Morrison Co., Limited
Fraser & Chalmers of Canada, Ltd
Mussens, Ltd.
The Wabi Iron Works
R. T. Gilman & Co.

Cages:
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Northern Canada Supply Co
Fraser & Chalmers of Canada, Ltd
The Electric Steel & Metals Co.
The Mine & Smelter Supply Co
Mussens, Ltd.
The Wabi Iron Works

geological deposits, and forest growth, many deposits that, like the flowers that are born to blush unseen, will never be uncovered. This is to be deplored but, with our present system of prospecting, it cannot be helped.

I have said that the Boundary ore-bodies contained 20 million tons. I am subject to correction, but I do not believe any other similar area in Canada, with the exception of the Sudbury district is known to be capable of producing appreciably more than that tonnage, and I am inclined to believe that the operators in some of the areas would be glad if they were sure of half that tonnage. This is not "huge". It is small compared with the 200 millions of the Braden, the 350 millions of the Chili Copper or the 400 millions of the Utah Copper. Mr. Corless' evidence before the Nickel Commission is to the effect that the Sudbury area, as a whole, has 70 million tons blocked out and that a possible tonnage of twice that figure is very doubtful. This tonnage, taking into consideration the grade, indicates Canada's most valuable mining asset, but with three large smelters working on it, its life is obviously limited.

The Boundary mines lasted 20 years. That is but a brief period in a nation's life. The Cornish deposits, now exhausted, lasted 2,000 years and the British are still a virile race. At the present rate of production the exhaustion of all the large Canadian deposits is therefore in sight. With the exception of the Flin-Flon there are no recent developments that will add appreciably to the tonnage and it is doubtful if the Flin-Flon, even after fully developed, will produce more than 20 million tons.

The Flin Flon is the representative of the Huronian, a formation not found in British Columbia. Much is expected from these mineral areas that are found at intervals in the Laurentian from Lake Huron to the Arctic. The Flin Flon, discovered about ten years ago is still in a class of its own in Northern Manitoba. It is doubtful, however, if all the outcrops in this particular Huronian area have been examined, as the war and the inaccessible location of the country have handicapped prospecting. The outlook for further important strikes in this area is, however, getting poorer every day. In other Huronian areas in Northern Manitoba prospecting has, so far, been conducted with negative results.

* * *

In regard to Quebec and the Maritime Provinces, asbestos is the only mineral except coal that figures in the millions column when it comes to yearly production. It should also be noted that asbestos is a non-metallic mineral and when it is necessary to include this mineral and also cement, drain tile, sand and red brick to make out a claim as a mineral section I think it is about time to stop bragging and realize what we are up against. These provinces contain a quarter of our population and probably about a quarter of our area; they have been settled, Labrador excepted, for hundreds of years and if there is any inconceivable mineral wealth there it is time we received a little on account.

I have not referred to the coal resources. In the last volume of the Transactions of the C. M. I. Mr. Herd says, "The Sydney coalfield undoubtedly contains a large tonnage but it has not the illimitable resources popularly supposed." On the Pacific coast the Nanaimo coal field is the most important. According to Clapp's Memoir it contains 1,340,000,000 tons. This is a tonnage worth while, but the trouble is that what a coalfield contains and what is recoverable are two widely different totals. This estimate includes seams one foot thick and assumes extraction to a depth of 4,000 ft. Present practice on the Island is to recover only about half the coal when it is over three feet thick and there are indications that a 4000-ft. depth is out of the question.

* * *

The Alberta coal reserve was delivered to the wrong address. It should have been left on the Pacific Coast or near Montreal. If we are to boast of inconceivable wealth some iron should have been left with it. A much smaller coal area would have done for Alberta even should a considerable amount of manufacturing be done there in the future. At present it is needed mainly to supply a seasonal demand for fuel.

The possession of valuable deposits of coal and iron, convenient to each other, is what has put Britain, France, Germany and the United States well up in the industrial world. We have spent millions of dollars on a hot-house iron industry and we are prepared to spend more if circumstances justify it. Last year's report, however, shows that only about 5 p. c. of the iron ore used in Canada was from our own mines. Low grade iron ores are talked about, but so is gold in sea water, and the present status is that they cannot be made to pay on their merits. A country, the size of ours, that does not possess commercial deposits of iron is very badly handicapped and anything to the contrary is a dream. Improvements in scientific methods will help not only low grade iron ores but ores of all kinds. Thanks, however, to the kaiser and our mania for railways and consequent taxation, it will call for very marked improvement in methods before even pre-war costs are reached.

* * *

A mining engineer should be an optimist, but when a deposit has its length and breadth defined, and it is found that they are not abnormally large, it is time to cease dreaming of a Rio Tinto, for the bottom is usually not far off. The same is the case with the Dominion. The accessible parts, and that includes many parts accessible only with difficulty, have been prospected. That stereotyped statement that "our mineral resources have hardly been scratched" is therefore out of date. The character of the mineral wealth in the outlying areas remaining is for the future to determine, but if this wealth does not average better than the results to date the total for the Dominion can be very easily conceived and an approximate date for its extinction arrived at.

The above represents the condition of affairs as I see it. I consider the situation serious in the extreme and I consider such language as I have referred to as particularly harmful. While I believe that the best man available should be appointed as Minister of Mines — that is unanimous—I also believe he should be a man who realizes the gravity of the situation and is prepared to see that the best use possible is made of the balance of our mineral resources, rather than one who is imbued with the extravagent ideas that I have felt it necessary to combat.

Yours,

C. M. CAMPBELL.

Cassidy, B. C.
Jan. 11 1922.

EDITORIAL

THE JOURNAL AND ITS READERS.

Curious, but quite understandable, misapprehensions exist concerning the functions and meaning of a technical journal. To many, perhaps to the majority, a technical publication signifies merely that some misguided person believes there is money to be made in launching such an enterprise. It may be mentioned, also, that not a few professional men, men who really should know better, have a vague idea that the technical periodical is more or less parasitical. It were well to clear away at once these wrongheaded ideas.

The properly conducted technical periodical is an organic part of the professional body politic. It is not, and never has been, a very inviting venture from the investor's point of view. Indeed, it cannot become even self-supporting without the active assistance and continued moral support of its constituents.

What, it may be asked, constitutes the value of the technical periodical? This question is easily answered.

In the first place it is (always postulating the support of its constituents) the clearing house of current technical thought. It is the forum wherein are debated and resolved the urgent problems of today, and wherein, also, is foreshadowed tomorrow's progress. It is the guardian alike of professional liberties and of professional ethics. The advance of industry and technology without such a medium is unthinkable.

It is obviously impossible for one man, or for any small group of men, to sit in editorial chairs and there distil and distribute wisdom drawn from their own intellectual reservoirs. But, apparently, this fact is only dimly apprehended by the busy member of the profession. No one, alas, is more painfully aware of these facts than is the poor and plural editor. Indeed, it is not the editorial conscience that needs awakening.

To be explicit, the Journal calls upon its readers, both those of the laity and those of the profession, to send ideas, topics for discussion, records of events, and any and all matter that may stimulate thought and inspire debate.

To achieve this high aim, the intellectual energy, professional experience, ambitions and even prejudices of editors and readers should be syndicated.

Let us devoutly pray for this desired consummation.

DUST AND VENTILATION.

The prevention of illness among miners is a matter that cannot have too much attention. A subcommittee of the American Institute of Mining and Metallurgical Engineers has been studying the subject and has recently reported on some of its investigations. Among these is a report on dust and ventilation which is of interest to gold miners.

The harmful nature of fine rock dust, such as arises from the operation of drilling machines, has long been well known. To combat this a great deal of work has been done, notably in the South Africa gold fields. The use of water has reduced the danger, but there are indications that water alone does not eliminate the danger of phthisis. Ventilation is important, and the exhaustion of air through pipes from drives and winzes is highly commended. One writer points out that in South Africa the large dust counts are found in unventilated working places.

An American investigator, Harrington, states that the most effective prevention of dust in mine air, apart from the elimination of dry drilling, is the circulation of pure air at the working face. In South Africa Orenstein and Ireland also emphasize that air in stopes should be induced to flow along the face and not back in the open waste. The efficiency and comfort of the worker are increased by air movement.

The investigating committee reports that the U. S. Bureau of Mines, the U. S. Public Health Service, the American Society of Heating and Ventilating Engineers, the National Research Council, and cooperating [illegible]

versities are now engaged in extensive laboratory studies to try to formulate definite standards of temperature, humidity and air movement to maintain health, efficiency and comfort of workers. Useful results will doubtless be obtained. It is work that will commend itself to all.

THE MISSING LINK.

To meet the needs of our continent-wide country, to provide the explorer and the prospector with geological maps, the miner with much-needed information, and to perform all the multitudinous duties that a governmental technical department is supposed to undertake, Canada possesses an absurdly undermanned Department of Mines. Neither the Geological Survey nor the Mines Branch—particularly the latter—receives one-quarter the appropriation it should.

For this state of affairs it is patently unjust to blame either the Survey or the Mines Branch. Nor is it our intention to asperse in any way the fair fame of these afflicted sisters. Far be it from so. The blighting truth—a truth long known to the generality of mining men—is that no Federal Government seems to have the dimmest sense of the degree in which Canada's future is bound up with the exploitation of her minerals.

There is a gap between the Government and the governed, a gap easily bridgeable. To this end there should be provided suitable means for presenting direct to Parliament the claims and aims of the mining community. The creation of a separate Ministry of Mines may not be necessary. At any rate the Honourable Mr. MacKenzie King does not deem it so. But there is no denying that something must be done.

If Royal Commissions have not fallen entirely into disrepute, we would suggest the expediency of the immediate appointment of one, to examine into and report upon the distressful situation indicated above. Upon the wise selection of *personnel* the success of such a Commission will depend. Our only suggestion is that it should consist of as few members as may be consonant with its necessarily representative character.

As has been frequently pointed out in these columns, the earning power of our great National railway systems will never be even approximately normal until Canada's mineral possibilities receive the attention they deserve. It is not yet commonly realized that our National railways traverse areas that embrace the greater proportion of our known mineral-bearing lands.

Since mineral deposits are discovered and developed by mining men, the mining man is the only channel through which the government can act effectively.

OUR IRON ORES AGAIN.

In a paper presented at a meeting of the Toronto branch of the Canadian Institute of Mining and Metallurgy, Mr. R. H. Flaherty, one of the best authorities on iron ore deposits in this country, commented on the fact that it has long been the habit of Canadians to view our iron ores with scant appreciation and to exert an equally scant effort upon their investigation and development. The lack of investigation is indicated by the fact that there has been less than 50,000 feet of diamond drilling done on Ontario deposits, while over eleven million feet of drilling has been done in the adjoining State of Minnesota.

We have many iron ranges in Ontario and some exploratory work has been done on them without disclosing large bodies of ore of the same grade as that which is imported from the United States, free of duty and at cheap water rates. Mr. Flaherty is of the opinion, however, that some of the deposits already discovered could be worked profitably in the face of this competition. There are apparently many who have accepted the view that we know enough about our iron ore deposits to conclude that they cannot be counted upon to supply our iron. So long as this view is generally held there will be little investigation of the facts and we will have continued repetition of pessimistic views from men who have slight knowledge of the facts. The statements made by Mr. Flaherty should help to bring about more activity in exploration of iron ore deposits.

It is well known that the search for iron ore in Ontario has resulted in discovery of very large quantities of material that has an average iron content somewhat below merchantable grade. It is also well known that some attempts have been made to establish an iron mining industry and that these attempts have not been successful. It is, however, unsafe to conclude that none of our known iron ore deposits can be profitably worked or that we have found our best ones. We need more exploration and more effort in devising methods suitable to our conditions.

Those who are satisfied that our iron deposits cannot be profitably used will never determine whether or not this is a fact. The pioneers in this as in other industries will be found among those who attack the problem and keep at it until it is no longer a problem. Exploration of known deposits, search for other deposits, investigation and improvement of processes for treating the ores, may result in the establishment of an iron mining industry here. The optimistic views of Mr. Flaherty are refreshing and, in view of his knowledge of the subject, should have a good influence on the unduly pessimistic.

EDITORIAL NOTES.

Whiskey from Peat?

According to the 'Northern Miner' the Peat Committee has received an order from a leading Ontario distiller for a large shipment of peat. Enquiry brought out the information that the peat is used to give a smoky flavor to whiskey. The "Miner" predicts that a gigantic new industry may spring up along the T. and N. O. Ry.

Potash Deposits in Oil-bearing Rocks.

In drilling for oil in Texas, operators have found potash salts in numerous beds and many localities. They are just beginning to preserve samples of the sludge in such cases. The U. S. Bureau of Mines reports the analysis of these samples periodically, with a remark upon their imperfect nature. It seems not impossible that potash beds of commercial value may be located by this means.

One wonders if this possibility is being kept in view by those who are drilling wells at present in Canada. The chance of finding important beds of potash salts would seem to offer a reward comparable to that afforded by a "gusher", and the scrutiny necessary to identify the salts in the sludge would not add materially to the cost of the well.

A Generous Geologist.

In a recent issue of "Science" there is a description of the gift made by Dr. I. C. White, since 1897 State Geologist of West Virginia and distinguished for his contributions to the geology of coal and petroleum, and Mrs. White to the University of West Virginia and the City of Morgantown. The gift consists of 1,911 acres of coal land in Marion county, and officers of the Geological Survey estimate that the tonnage of the acreage will approximate 15,000,000 and on a conservative royalty basis should yield at least $4,000,000 over a period of years, $2,000,000 to the city and $2,000,000 to the university.

By the deed of gift the university funds are to be used to equip and maintain a geological department at the State university. The city's share is to be employed for the purchase, improvement and maintenance of a public park and for securing, equipping and maintaining a public hospital.

Dr. White, the generous donor, is well known to most Canadian geologists. He is sometimes called the father of the anticlinal hypothesis, which has been of such great service in the development of petroleum and natural gas fields. A year ago, at the meeting of the Geological Society of America in Chicago, he was the retiring president. Dr. White's career illustrates the fact that a study of pure science sometimes leads to great economic results.

Mine Telephones and Gas Explosions.

That telephones used in coal mines may be the cause of mine explosions is shown by investigations carried out by the U. S. Bureau of Mines at the experiment station at Pittsburgh. The ringing of the magneto makes the telephone in gaseous atmosphere a source of danger. In the trials numerous ignitions and explosions were obtained in a gallery in which there was a mixture of natural gas and air.

The results of the investigation should lead to more care in the use of telephones in coal mines. A type of instrument that lessens the danger should be used. The ordinary mine telephone is not explosion-proof.

Map of Gowganda Silver Area.

A new map of the Gowganda Silver Area is just off the press and copies can be obtained on application to the Department of Mines, Toronto. This map was published to accompany a report on the area by Mr. A. G. Burrows of the geology staff of the Department. The surface geology has been carefully plotted and there are two sections showing the structure. The report is still in the hands of the printers, but it also will be available in a few days.

RIBBLE MINES LTD.

Ribble Mines Ltd. has been organized in Ontario with a capital of $2,000,000 to finance mining enterprises. The first business of the company will be the development of the Wasapika gold mine. The directors of the new company are Geo. R. Rogers, president; R. E. Hore, L. J. Lahay, J. E. Day, and J. C. Mahon. The head office is in Toronto.

LAMENTATIONS.

Now, woe is me that ever I
Chose Mining Engineering;
Life's zenith is distressing nigh;
Gaunt poverty is leering.

More woe is me, and woe again,
That, when I did the choosing,
I chose a life so full of pain —
The prize forever losing.

Well, lack a day! chen! alas!
Fees furnish feeble feeding;
Employers turn me out to grass;
Promoters do the leading.

I have no bailiwick, nor home;
No hearth to warm my feet at;
With growing years the more I roam;
'Tis sure enough to greet at.

Yet did I once more make my choice,
Despite my bitter sneering,
Methinks I'd give a willing voice
To Mining Engineering!

ANON

PERSONALS

Mr. W. R. Wilson of Fernie, B.C. and Mr. Norman R. Fisher of Thetford Mines, Quebec, are candidates for the presidency of the Canadian Institute of Mining and Metallurgy.

The Ontario candidates for the two vacancies on the Council of the Institute are John McLeish, W. H. Collins, James McEvoy, Geo. C. Bateman and D. E. Keeley.

Mr. A. J. Young has been elected president of the Atlas Gold Mining Co.

Trail Smelter In 1921

Metallurgical advances again keep pace with declining prices; Lead and Zinc Plants break their best records; Machinery for projected Kimberley Concentrator will be made in Tadanac Machine Shop; year ends with accumulated stocks well reduced, chiefly on foreign orders.

Metallurgical advances in the treatment of the zinc-lead ore of the great Sullivan mine at Kimberley have for the second year in succession kept full pace with the declining prices of those metals, and have enabled the Consolidated Mining and Smelting Company of Canada to keep in continuous operation the group of plants at Trail, known as the Trail smelter. These advances, with the large tonnage upon which they have been put into practice, have been the vital factors in enabling the company to maintain operation during a very difficult year, for the sake of the mining industry and of the communities dependent upon the company's activities.

In following this course, the Consolidated has been in rather conspicuous contrast to the smelting industry of the continent as a whole, many tremendous plants being absolutely cold. In copper for instance, there are idle smelters at Great Falls, Anaconda, Garfield, and Mason Valley. The Tacoma plant is down to 60 per cent of its capacity. In lead, Tooele has been shut down completely. Midvale and Murray are running on much reduced tonnage, and Bunker Hill and Helena have each only one furnace going. The Great Falls zinc plant, while shut down for the greater part of the year, is now running at about 25 per cent. The confession of these companies that use their own ore, that they cannot operate profitable at present, explains perhaps why lesser producers have also had a hard time.

Lead and Zinc Break Records.

So far as lead and zinc are concerned, Trail has broken all its records, and the smelter is operating, and has operated throughout the year, full blast. For the last six months every plant at Trail connected with either of those metals has broken its own record month by month, incident to the improvements in treatment. There is another angle to this, it being obvious that large scale operation is necessary if costs are to be at the minimum, which they must be in order to make operation reasonable. An example of this expansion of output is the test mill at Trail, built for the Sullivan ore, whose original capacity of 500 tons per day has now worked up to 1,000 tons which is probably not yet the limit. The lead and zinc ores are no longer shipped separately, but all the Sullivan ore goes the one route, being separated in the course of milling, the zinc plant producing lead concentrate as a by-product.

The essential point is that the concentrator is recovering more lead as a high-grade lead concentrate, and more zinc as a high-grade zinc concentrate, so that a ton of Sullivan ore nowadays yields more pounds of refined metal than such a ton did formerly. This is a very moderate statement of the facts. Various processes have been devised and given a trial in the test mill, but flotation is the basis of the present satisfactory recoveries. Incidentally a certain old criticism of the Trail smelter must now be revised, for it can no longer be contended that the Sullivan ore is being financed at the expense of shipments from private mines, when there is no zinc ore from private shippers to mix with the Sullivan ore.

Progress At The Sullivan.

While the metallurgical staff at Trail has been winning its victories over the Sullivan complex ore, the mines department has further developed the great property by putting through the raise from the "tunnel" below to the "hill" above, thus connecting the two mines by an air-way that in the course of time will be utilized for taking out the ore below the level of the upper workings. The "tunnel", which was driven to the ledge in 1920, is at present furnishing the bulk of the ore. The most modern methods are, of course, used in mining the ore, power scrapers being used to haul the broken-down ore into the raises, where it reaches the cars by way of chutes, or, where conditions are suitable, the cars are loaded by mechanical muckers.

Copper Output Lower.

Though the Trail smelter has operated during 1921 on a larger tonnage than ever before in its history, this record has been made in spite of a reduction of its copper tonnage. The copper market has been a strict mistress, for in this case there has not been the opportunity for compensating advances in metallurgy. During the last half of the year the Emma, the Consolidated's principal property in the Boundary, was not operated, and the company's famous Rossland mines are being asked for considerably less than their normal tonnage. Throughout the year the big property of the Canada Copper company at Copper Mountain, near Princeton, whose concentrates Trail prepared itself to handle, was not operated. In fact, from five to ten tons a day has been the output of the copper refinery during 1921.

This is not for want, however, of capacity. Early in the year the extensions and improvements were completed that enlarged the capacity of the copper refinery from 30 tons to 70 tons, the extension having been made to secure more economical operation.

Copper Rod Mill Awaits Duty.

The rod mill, with a capacity of eight tons of copper or brass rods per eight-hour shift, could be put into operation at a few days' notice. The building is of re-inforced concrete, with steel roof and cast iron floor, and the plant comprises a Hoagland mill of the very latest pattern. All the machinery is in the building, and most of it is set up, ready for use. Rods and wire bar are the only forms of copper that now come into Canada duty free, and the New Jersey and New York plants, by reason of proximity, have the market. If the duty asked by the Kootenay is placed on these forms of copper, the Trail plant will be able to add this new branch to Canadian industry.

Financial conditions have dictated practically the entire suspension of development work in the company's many minor properties and prospects, owned or under lease, and the company's mining activity has been central on the Sullivan and the Rossland group of properties, with the Emma for a portion of the year. That some large properties in the Kootenay

can successfully operate under present market conditions is gratifying, when contrasted with the fact, for example, that $40,000 is being dispensed monthly as charity in a mining center like Butte.

Development Program.

The same financial conditions have naturally shelved temporarily both the development projects that are popularly supposed to be on the Consolidated's program for the future. When the time comes when they can again be considered, it is expected that the large concentrator at Kimberley for the Sullivan ore will have the preference, for when that is built it will release the present test mill at Trail, for the use of Rossland ores. When built, this concentrator will save fortunes in freight on the carriage of the crude ore from Kimberley to Trail, and its successive units will enable the Sullivan to multiply its output.

Similarly, the proposed concentrator for the Rossland mines, at a location said to be already chosen adjacent to Trail, would result in multiplication of the Rossland tonnage.

A necessary part of the development program, when it comes, will be the further development of the big plant at Bonnington, of the West Kootenay Power and Light company, now a subsidiary of the Consolidated.

Make Own Machinery.

An interesting present development is connected with the company's machine shop at Trail, now supposed to be the finest in the province. From now on, it is proposed to construct at Trail as much of the machinery required by the company as possible. This will be more satisfactory than buying it, and it will often be more economical as well, beside the consideration of giving employment to workmen at Trail. A lathe is to be installed that will swing a cylinder 10 feet in diameter and 17 feet long, or one 20 feet in diameter and three feet long. It will be possible for the Trail shop to make all the machinery required for the Sullivan concentrator except the motors and crushers, and it is not improbable that work on this machinery may be started before long.

The Financing Problem.

A desire to push its new Sullivan ore treatment processes to completion, and the desire to hold together a highly efficient organization, added weight to the considerations against shutting down the Trail plant, and along with it a good deal of the Kootenay, at a time when other mining companies bowed to market conditions and refused to deplete their ore reserves without hope of profit. But it has been difficult going.

Not only were metal markets low, but also in many cases they were fictitious, and there was not a real demand behind published prices, the result of offering metal at current quotations being to further break prices, with perhaps no sales in the end. All over the globe, markets for the metals produced at Trail have been assiduously sought.

During the greater part of the year the store of metals at Trail has been increasing despite the best efforts of salesmanship. During the last two months, however, the lead pile has been pretty well reduced, two thirds of it being sold to foreign markets, while most of the home consumption has been from Tadanac. The zinc sales have also been picking up materially, though Canada takes very little of this product, most of it being sold abroad.

With easier financing, the Consolidated has notified the lead shippers that after January 1, settlements for their ore will be on a spot basis, changing from the 90-day notes that have been in use since September 1. Prior to that, Trail always operated on deferred settlements.

The full significance of the year's operations, taken inclusively, will not be grasped till it is recalled that zinc, which is the basis of both the year's tonnage and much of the year's income, is selling today at a cent less than the average of the 10-year period preceding the war, and that lead, its companion metal, is down to the pre-war price.

Still The Keystone.

The Trail smelter is the keystone of metal mining in British Columbia. It is a unique collection of plants that so far as known is not duplicated in the world. It comprises:

A copper smelter.
A lead smelter.
A zinc plant.
An electrolytic lead refinery.
An electrolytic copper refinery.
An electrolytic zinc refinery.
A refinery for the precious metals.
A copper rod mill, not yet operated.

A number of these plants, including all three electrolytic refineries, are the only ones of their kind in Canada. Including plants, ore, and stocks, the company's investment from year to year according to its annual reports, amounts to $17,000,000 or $18,000,000.

While the mining interests of the Consolidated increase from year to year, and its own tonnage exceeds by many times the aggregate tonnage of private shippers, its plant is, of course, at the public service, and at some stage or other is used by practically every mine in this territory, and by many beyond the provincial boundaries.

The same market conditions that made it difficult for Trail to operate, temporarily put a blanket on Kootenay mining in general; but during the last six months the list of shippers has expanded to almost its usual proportions, though for the year just ended the custom tonnage is very light. The year ends, however, with a materially better outlook for mining generally.

OIL DISTILLATION IN NOVA SCOTIA

Toronto—The proposed developments of the Anglo Persian Oil Company and allied interests of the oil and shale territory in Pictou County, N.S., will be under executive control of the Oil and Nitrate Company with head office at Chatham, Ont., according to an announcement from London. This company will have charge of the development and construction, and will have the co-operation of the Anglo Persian Oil Company's engineering staff. It is proposed to immediately establish a plant on the property capable of treating 2,000 tons of shale a day.

In addition to the shale plant to extract the crude oil and ammonium sulphate, there will be refining facilities for handling a complete line of petroleum products.

A great deal of prospecting and experimental work has already been carried on by experts associated with the Anglo Persian, and the result has been a pledge of £5,000,000, of which £1,000,000 will be immediately available.

Mineralography*

by E. THOMSON.

The microscopic study of opaque materials by reflected light is not a new subject. For some years the metallurgists have used this method for the examination of metal surfaces, more particularly to bring out the microscopic character of various grades of steel products. In its application to the study of minerals it is especially useful for the determination of the opaque minerals, as these can not be studied microscopically by transmitted light. The optical properties which are so useful in the identification of the transparent minerals depend entirely on light passing through the specimen and will not serve in the case of opaque minerals. It is true that the few ores that are encountered as accessory constituents in rock sections can be determined with fair accuracy, by reflected light it may be noted in passing, but the method fails altogether in the determination of the multitude of opaque minerals to be found in ore deposits of various kinds. This very practical phase of the application of microscopy to the study of minerals is taken care of by the examination in reflected light, and a very high degree of accuracy in the determination of these ores can be attained in the majority of cases.

The pioneer work in this subject dates as far back as 1814 when Berzelius sliced and polished a specimen of pyrrhotite. He noted that the pyrrhotite was cut by small veins of another mineral but did not examine the section under the microscope. It would be unprofitable to repeat the names of all the investigators in this field since that time. It will be sufficient to state that only within recent years has the study attained any prominence, chiefly through the efforts of such men as Campbell, Knight, Graton, Lindgren, Murdoch, Bateman, Davy, and Farnham. The first two named carried out experiments on ores from Sudbury and Cobalt, describing the characteristics of the minerals in them. Murdoch published a text-book on the subject classifying the minerals on the basis of color and microchemical properties. Davy and Farnham collaborated in another book on the subject, in which the minerals are classified chiefly on the basis of microchemical reactions and to a lesser extent on their physical properties.

For the proper examination of the opaque section by reflected light a smooth polished surface of it must first be prepared, so that as much light as possible is reflected. This process is carried out in three definite stages, the first two being grinding operations and the last one polishing. In the first stage the mineral is ground down to an even surface, progressively finer grades of abrasives being used till the abrasion pits are very minute and of uniform size. The procedure varies slightly in different cases. Where it is desired to cut the mineral specimen in a particular way, the diamond saw may be used to advantage. In cases where the specimen contains two or three minerals of widely differing hardnesses the later stages of grinding with the finer abrasives may be lengthened to give a more uniform surface. The grinding may be carried out satisfactorily on motor-driven horizontally-revolving steel plates, or more simply by hand on a stationary steel plate, the abrasives being fed on along with water. In both cases the plates must be thoroughly cleaned of the abrasive last used before starting with that of finer grade. In the second stage of polishing the specimen is carefully beveled so that no sharp corners or edges remain to catch in the cloth with which the polishing wheels are covered. This may be done quite rapidly on a motor-driven emery-wheel. As some minerals change their composition when heated, care must be exercised during this operation to keep the specimen cool by constant dipping in water. In the third stage of preparation several grades of polishing powder are used, varying from fine alundum flour to rouge or tin oxide. The polishing of the section may be done roughly by hand but is much more effectively accomplished by machine. The machines used are of two types, the one with a horizontal spindle on which revolve two vertical wheels, the other with a vertical spindle carrying one horizontal wheel, which is kept covered when not in use to protect the surface from dust. Both of these have their advantages. The first one, while a little more awkward to work on, has the advantages of providing more than one polishing surface to the one machine and also of obviating the necessity of covering the polishing surfaces when not in use. The second one has the decided advantage of being easier to work on. The polishing surfaces are covered with linen for the most part, although in the final stage of the polishing a broadcloth or velours covering has been found very effective. The length of time the specimen is held on each polishing surface varies with the mineral mixtures. The polishing powders are mixed to a fluid paste with water and fed on wet with a brush provided for that purpose. To avoid any possibility of mixing the powders, separate dishes and brushes are provided for each, and these are kept carefully covered to keep out the dust. Between the stages of this polishing it is necessary also to wash thoroughly not only the specimen but the hands of the operator as well, so that none of the powder from one stage will be carried on to the next. After the final burnishing on the last surface the specimen is ready for examination. Where the section is very brittle the same procedure as for the preparation of friable thin sections by cementing with balsam, may be adopted. In specimens too small to be held in the hand, which would include mineral powders and mill-products, the material is embedded carefully in sealing-wax before being polished. In this way powders fine enough to pass through a 200-mesh screen may be given a very satisfactory polish.

The section, being now ready for examination under the microscope, is mounted in some plastic substance, preferably artists' clay, on a small glass slide of a size to suit the microscope used. Various schemes are employed to insure the exact horizontal position of the section, the simplest way being to place an annular ring of constant height around the specimen and then squeeze the section down in the clay with a level glass plate till the plate rests evenly on the ring all the way round. Any ordinary microscope with but one extra fitting may be used for this work. This extra part is called a vertical illuminator and consists of a short tube inside of which revolves a reflecting device and with an aperture at one side for admitting the light. The reflector may be of the plane glass, half-mirror, or prism types. This illuminator is placed immediately above the objective lens of the microscope. The light enters the small aperture at one side, is reflected or refracted

* A paper presented at the Toronto meeting of the A. A. A. S.

down to the polished section and from there is reflected up the middle of the microscope tube to the eye. The prism type of illuminator is the best one for this class of work and can be fitted in the Swift, Leitz, or Bausch and Lomb microscopes. The best work is done by daylight, preferably in the morning when the light is strong. For dark days or for night work, artificial light may be used, the source of light being placed close to the aperture in the illuminator. A convenient form of lamp for this purpose is the so-called "Daylight Lamps", equipped with a light blue glass in front of the light bulb, by means of which the colors as seen in daylight may be imitated fairly closely. In certain cases it may be desired to study effects in oblique light. The Silverman illuminator is especially designed for this part of the work. It consists of a circular lamp which clamps on to the nose of the objective. This appliance is particularly useful in the determination of the transparent ores, such as sphalerite, where internal reflections may be noted. For testing the hardness of the minerals a convenient instrument is the familiar shoe-makers' awl sharpened to a point. Only three grades of hardness, low, medium, and high are attempted in this work and these can be easily determined with such a simple instrument. The minerals with low hardness are scratched with little pressure, those with medium hardness with fairly heavy pressure, and those with high hardness very little if at all with any pressure. In the microscopic examination of the polished sections certain physical properties such as the color, hardness, relief, crystal form, and cleavage are used, but the microchemical reactions are of chief importance in the identification of the mineral species. A set of six standard reagents is used and the reactions of the mineral to each one carefully noted. Bottles fitted with a combined rubber nipple, stopper, and capillary-tube, are used to hold the reagents, a drop of the liquid being placed on the section at the spot desired by squeezing the nipple. A convenient text-book has been prepared by Davy and Farnham in which the minerals are listed in tabular form depending on their reactions with these standard reagents. With these tables as a basis one can run down the majority of minerals in fairly quick time, the one regrettable feature being the dependence placed on the effervescence with dilute nitric acid. Where the section contains considerable carbonate, this part of the tables has to be used with discretion. The reagents used are dilute nitric acid, dilute hydrochloric acid, a 20 p.c. solution of potassium cyanide, a 20 p.c. solution of ferric chloride, and saturated solutions of potassium hydroxide and of mercuric chloride. Special microchemical tests may be used for the detection of various metals, as for example the familiar dimethyl glyoxime test for nickel, or the potassium ferro- and ferri-cyanides for iron. Not only may the minerals in the section be determined accurately by this method, but the genetic relationships of the one to the other may be judged with quite as much accuracy as in the case of the transparent minerals in thin sections. This is of value particularly where the question of secondary enrichment is to be studied.

So that a permanent record of the various mineral sections may be kept, it is necessary to take microphotographs with instruments especially designed for that purpose. A convenient form of apparatus is the Bausch and Lomb Metallographic Outfit, which has a camera, microscope, condensing lens, and lantern fitted up on an optical bench. The source of light commonly employed is either the ordinary arc lamp, using very small carbons to produce a fine pencil of light, or a special electric bulb with a filament which will focus the light to a point. With this equipment, which may be fitted with an oil immersion lens, magnifications of over 1000 diameters may be obtained. For ordinary microphotographic work a magnification of 100 to 150 diameters is quite sufficient to bring out the detail desired. As most of the minerals differ from one another but slightly in color, light filters of various kinds are needed to show up the different minerals in these photographs. It is interesting to note in this connection that the two minerals, bornite and chalcocite, while radically different in color to the eye, are indistinguishable in the photograph unless a color-screen is used. Each combination of minerals presents a separate problem and the length of exposure, size of aperture, and color-screen to be used must be determined experimentally. Special plates with a very rapid emulsion are used and must be developed in green light, being sensitive to the red rays. Tank development is to be recommended as giving more uniform results.

This method has numerous applications, not only in the study of solid minerals, but also for the examination of fragmental material and mill-products. Not only may the individual minerals contained in the specimen be determined with a good degree of accuracy, but also their size, shape, and relation to the minerals associated with them. The practical value of this is strikingly illustrated in the case of certain ore deposits, which contain large tonnages of valuable mineral and would appear on casual inspection to be worth development. On microscopic examination of the ores concerned however, it appears that the minerals are so intimately mixed as to make the separation of them too costly for profit. The genetic relationships of the ores may be studied by this method with very satisfactory results, the primary and secondary minerals being frequently quite easy to distinguish. The value of this determination in the case of deposits where secondary enrichment may be expected need not be emphasized here. As an aid to the various stages of milling this method should be invaluable, although this phase of the subject is still in the experimental stages. The separation of different minerals in the crushing of ores may be satisfactorily traced by microscopic observation of the particles in each stage of crushing. In very many ores, two, three, or even four minerals are intimately mixed together and it is a matter of supreme importance to the mill man to determine the size to which the particles must be crushed to separate the valuable from the valueless mineral. Not only the ore in the different stages of crushing but also the concentrates and tailings from the other milling processes may be profitably examined in this way. The importance of this from an ore separation standpoint is obvious. But the most important function of this method of microscopic determination is to serve as a control over chemical analysis. Take for example an ore which on analysis shows certain proportions of copper, iron, and sulphur. The analysis which duly tells the quantities of these elements present, may be supplemented by mineralographic determination which discloses the presence of the minerals bornite, chalcocite, and pyrite, and which shows the approximate proportions. [illegible] I quote from an actual case where only bornite and chalcocite were visible in the hand specimen. This is a very simple illustration and the value of the control is better shown in more complicated mixtures. The

Port Arthur district, or more particularly Silver Islet, was credited for some time with a rare silver arsenide called macfarlanite which had been found nowhere else in the world. It is true the analysis looked rather peculiar, listing appreciable amounts of nickel, lead, zinc, and sulphur as well as the silver and arsenic, and many of us suspected its individuality as a true mineral species, but nevertheless it was listed in Dana's System of Mineralogy. A year ago last summer when the old Silver Islet Mine was unwatered an opportunity was afforded Professor Parsons of our department to collect some of this macfarlanite material for microscopic investigation. When polished and examined it proved to be a mixture of native silver, niccolite, and galena, with smaller amounts of sphalerite. Another illustration of the success of this method when applied in this direction was encountered in the case of the mineral dyserasite, an antimonide of silver the analysis of which varied from about Ag3 Sb to Ag6 Sb. On examination under the microscope the variation was traced to a more or less graphic intergrowth between native silver and a silver antimonide, the latter presumably corresponding to the formula Ag3 Sb.

In conclusion it would appear that this method opens up a very wide field for the microscopic investigation of the opaque minerals. For the economic geologist and the mineralogist it furnishes quite as much microscopic evidence as a thin section of the transparent minerals is rocks and will have infinitely more practical value. All determinations have so far been carried out in ordinary light, but there are possibilities in the direction of observation in polarized light that have not as yet been tested.

GOVERNMENT OWNERSHIP OF MINES.

by J. A. McRAE.

Government ownership of mines would probably retard progress and would rob the country of the great benefit of the individual enterprise that is so essential to the speculative business of mining, particularly in the early stages of exploration and development.

In regard to precious metal mines, particularly gold, it is probable that government ownership would be disastrous. The reason is this: the prospecting and exploring of mining land is extremely expensive and is carried on for the reason that when success is achieved it is usually highly lucrative. Students of mining have estimated that for the recovery of each ounce of gold produced throughout the world, which has a fixed value of $20.67 per ounce, there is between $35 and $40 spent in one way and another. That is to say that the government would sustain a loss of perhaps $15 on each ounce of gold produced. It is true that the government could take over the mines that are already established and could operate them at a substantial profit; but the business of carrying on exploration work would gradually consume these profits and the industry would develop into a liability.

Prospecting is done by men who devote a great part of their lives to the work, without wages or compensation of any kind unless they are fortunate enough to stake something saleable. These prospects are purchased by promoters who organize companies and sell stock to the public. The loss of $15 per ounce on each ounce of gold produced the world over is thereby distributed over prospectors and speculators who are gambling on the long odds. Occasionally, success is achieved and prospectors make fortunes while stockholders become millionaires. Those who lose, either quit or save up for another venture, while new speculators are created by the fortunes made by the lucky ones. The world is ever ready to forget about the failures, and to point out the courage of the successful men who have taken a chance.

By all means, let us discourage any thought of government ownership of precious metal mines. The wide expanses of Northern Canada are crying out for men of courage, initiative and enterprise to blaze new trails at some cost and personal sacrifice. Reward is offered to only a small percentage, but falls in lavish abundance in the laps of the lucky few.

In the northern parts of the provinces of Ontario, Quebec and Manitoba, especially Northern Ontario, Nature has placed a veritable storehouse of fortune. The gold-ore deposits already found in Northern Ontario offer the possibility of yielding eventually a billion dollars, while farther north lie virgin fields.

These facts are given, not with the intention of creating the impression that fortune awaits all those that are prepared to do the pioneering. Not so; for the difficulties are many, the hardships of pioneering are frequently severe, and the obstacles are manifold.

Under government control, the incentive to exploration would become minimized. Self-sacrifice, courage and the willingness to endure harship are the products of voluntary action, generally for individual gain. Out of this there arises an industry that bestows riches upon the successful, while the benefit to the government is the establishment of mining enterprises and the creation of communities that in turn are taxable, and thereby contribute their share to the maintenance of government.

The progress of the mining industry rests upon our continuing to give the individual an opportunity to succeed in a big way, if at all. The cost of paid pioneering would be so great as to definitely preclude the possibility of government ownership of precious metal mines in the Dominion.

A PERFECT MINE.

There is one perfect mine and mining town.

Every official of this mine and every man employed underground or on top always does his work well and never breaks the safety rules. There are never any accidents at this mine, nothing ever goes wrong, the working conditions are fine. Everybody is contented and happy, no one quits or gets fired. There is work every day and the pay is good.

The town is clean and sanitary; the houses are comfortable; there is a good school; there is never any sickness; all the prices are reasonable; no one ever offends his neighbor; and all is peace and contentment.

This is the Ideal Mine, located in Modeltown, Progressive County, State of Good Health.

PETROLEUM PRODUCTION.

New York.—World production of petroleum in 1921 is preliminarily estimated by the United States Geological Survey at 750,000,000 barrels, as compared with 695,000,000 barrels produced in 1920. Production of petroleum in the United States in 1921, as indicated by the quantity transported from producing companies, compiled from company reports to the survey, amounted to 469,369,000 barrels, representing an estimated value at the wells of $753, 300,000, according to announcement made today. The high record daily average production of crude oil in the United States was reached during the week ended January 14, 1922, and was 1,430,710 barrels.

Northern Ontario Letter

THE GOLD MINES.

Will Develop Sturgeon Falls Power.

Confirmation has been received by the Journal correspondent that the Northern Canada Power Company has made the necessary arrangements to develop hydro-electric energy at Sturgeon Falls on the Mattagamai River provided the litigation with the Hollinger Consolidated Gold Mines is cleared up within a reasonably short time. At the time of writing from the mining district, the decision of the court in the power dispute is expected hourly and interest is running high. Should the matter be cleared up, the work of taking in supplies for the new development would commence almost immediately. It has been learned that the Sturgeon Falls could be developed within approximately nine months from the date of commencing the work, and this tends to hold out promise of the additional 7,000 h.p. being available for use at the mines by the end of the current year.

Present Power Situation.

With regard to the present power situation at Porcupine, it has been officially learned that the mines will get through the winter without shortage. Also, that the spring freshet will result in sufficient water being stored to assure all necessary energy up to the end of this year. The new dam at Kenogamissee Lake which was completed last fall will cause the water to rise back for twenty miles and will increase the volume in storage to approximately six times the former capacity. The importance of the arrangement to carry on additional development at Sturgeon Falls is that this will assure the producing mines not only of continued requirements as at present, but will provide the additional energy required to operate the big additions which are being made to the milling plants. Also it will assure energy for the smaller and newer properties which are in a state of exploration or development.

Dome Capital Reduction.

A special general meeting has been called for February 11 by the Dome Mines Company for the purpose of passing by-laws in connection with carrying out the proposed capital reduction. It is planned to empower the director to make capital repayments when desired without having to hold special meetings prior to each payment. The first of these repayments will be made on April 20, and will amount to $1.00 per share, thereby automatically reducing the par value of Dome shares from $10.00 as at present to $9.00 per share. It is generally believed that the Dome will be able to make a second reduction of like amount during the fiscal year. In the meantime, the regular dividends of 10 p.c. annually, are being paid Shareholders are thereby assured of 20 p.c during the coming fiscal year with good prospects of receiving 30 p.c.

Porcupine V. N. T.

An application has been cabled from London asking for power from the Northern Canada Power Company to re-open the Porcupine V. N. T. Mines. It is understood that the company is desirous of resuming operations almost immediately. Concerning this, the power company has given assurance that the required energy can be secured at the beginning of April. It is the plan of Major Bell of the Porcupine V. N. T. to continue the main shaft from its present depth of 600 feet to a depth of 900 feet. Lateral work will be extended at the 600 ft. level where good ore is already in sight, while another development level will be opened up at a depth of 750 feet and still another at a depth of 900 feet. Following the completion of this work, the $70,000 provided from the sale of 475,000 treasury shares at 15 cents each will be pretty well exhausted and the company will then be confronted with the question of financing further work from production. As to this, should development work continue satisfactory it is believed that the present mill might be operated on a scale that would provide additional money for further construction, either that or would warrant borrowing sufficient money to finance the building of a big plant. On the other hand, should results be satisfactory only to a limited extent it is not considered improbable that the concern might figure in a consolidation with an adjoining property on which a first class mill is already available to treat the ore.

Elbow Lake.

According to advice from a director of the Hollinger Consolidated Gold Mines, the reports have recently been wrong about this company having taken over property in the Elbow Lake district in Manitoba. The truth would appear to be that certain of the directors of the Hollinger, through a private syndicate, have interested themselves in an option on the property of the Murray Brothers and that considerable exploration work is planned.

Triplex.

Duncan B. Harrison of the Triplex Gold Mines, formerly the Tommy Burns and the Pope properties, has purchased the old mill of the Casey-Cobalt and plans to have the equipment taken down and shipped to the Triplex within a short time. No arrangements appear to have been made however with the power company for electric energy to operate the mill and this has lead to the belief that the equipment is not intended for use for some time.

Paymaster.

Some weeks ago the Journal made the announcement that Dr. Walter Harvey Weed had made an examination of the Paymaster property situated south west of the Dome Mines and had recommended that the shaft be continued to a depth of 100 to 500 feet. This report of Dr. Weed's has now been submitted. In the meantime the work in connection with deepening the main shaft has been under way for some weeks. Another cross-cut will be driven at a depth of 100 feet for the purpose of determining the average gold content of the 98 ft. wide body at that horizon.

Teck-Hughes.

During the next few months the development work on the Teck Hughes Gold Mines promises to attract widespread attention particularly on account of high grade gold telluride ore having been encountered at the 600 ft. level and on account of the decision to carry work as fast as possible to a depth of 980 feet. It requires little breadth of imagination to grasp the importance of what continued favorable development to that depth would be to stockholders of the Teck Hughes. Lateral operations at these lower levels will be well under way by the middle of the current year.

Queen Lebel.

At a depth of 18 feet on the Queen Lebel property the vein is stated to have widened out considerably, being of greater width than the shaft.

Ontario Kirkland

The first gold bar from the Ontario Kirkland Gold

Mines will be shipped this month and the indications appear to be that the enterprise will experience no difficulty in showing substantial profits. A rich strike was made on the mine this week at a depth of 150 feet where the vein is about six feet in width.

The Kirkland Lake Board of Trade is now lending its support to the agitation in favor of having the Kirkland Lake highway extended eastward through the townships of Lebel and Gauthier and to Larder Lake. An effort is also being made to encourage the Ontario Government to extend the Goodfish Lake road northward to the Lightning River Gold area.

THE SILVER MINES.

Kerr Lake.

Operations have been completely suspended on the Kerr Lake mine and no effort will be made to resume work until such time as wages and the cost of material declines considerably or until the price of silver increases. The result of development work during recent months has not been very satisfactory and it has been found that the low grade ore now in sight cannot be handled profitably under existing conditions. Harry Kee, manager, left a few days ago for New York and gave the foregoing information to the Journal representative at the hour of his departure. It is understood that some of the older employees of the company may be taken to Utah where the Kerr Lake is operating a silver property on a profitable basis.

Haileybury Frontier.

A feature of the work which the Mining Corporation of Canada proposes doing on the Haileybury Frontier property in South Lorrain is that a new shaft will be put down at a point from which to carry on exploration and development along the continuation of the fracture in which the Woods vein on the adjoining Keeley Silver Mines is yielding such high grade ore. While this work is being done, the present workings of the Haileybury Frontier will be kept open and there are said to be good prospects of the present known limited shoots of high grade ore being found to continue beyond their present known limits. It is not improbable that the ore taken out may pay the cost of the general plan of exploration and development work. In the meantime, the machinery which has been taken to the Frontier from the old Cobalt Lake mine is being brought into operation.

Nipissing's Report.

It is expected that the annual report of the Nipissing Mining Company will be out about the end of the current month and will show a production of upwards of three million ounces of silver during the past year. As regards ore reserves, nothing official has been learned. It is general knowledge however, that some very rich ore was developed during the closing months of 1921, but whether or not these shoots were sufficient to offset the volume of silver extracted during the year is not officially stated as yet.

Silver Producers at Cobalt.

Silver producers in the Cobalt district now include the following mines in order of importance: Nipissing, Mining Corporation, Coniagas, O'Brien and Bailey Silver Mines. The total pay roll is now between 600 and 700 men.

In an effort to get out of financial difficulties the Cobalt town council is considering a plan to appeal to the Ontario Government for more revenue by taxation of such mines as are producing silver from property held within the corporation limits.

May Re-open in Spring.

The decision to suspend operations on the Kerr Lake mine has not discouraged the belief that the Cobalt field will experience a fairly general revival of activity in the coming spring. Such mines as the McKinley-Darragh, Beaver Consolidated and Temiskaming are expected to figure among the properties being re-opened at that time.

Castle-Trethewey.

The incorporation has been completed of the Castle-Trethewey Silver Mines Company to take over the assets and liabilities of the old Trethewey-Cobalt Silver Mines, the deal as outlined recently in these columns being ratified in detail. It is hoped to soon get operations under way on the Castle property in the Gowganda district.

Boards of Trade meet at Timmins.

A meeting of the Temiskaming and Northern Ontario Associated Boards of Trade will be held in Timmins this month, and will deal particularly with problems of interest to the mining industry. It is probable that the questions of cooperation, transportation and motive power will figure prominently in the subjects of discussion.

Maidens Mines.

At a recent meeting of the stockholders and bondholders of the old Maidens Mine in South Lorrain there were two offers made by which the property could be de-watered and sampled with a view toward resuming operations. One of these came from Hugh Sutherland of Toronto and was rejected. A second came from Arthur Ferland of Haileybury and this was also rejected. It was finally decided to double the capitalization to 2,000,000 shares of the par value of $1.00 each instead of 1,000,000 as heretofore. The holders of bonds amounting to about $12,000 agreed to take stock in settlement. It is now planned to sell a limited amount of the new treasury stock as a means of financing the work of having the mine de-watered and sampled. Some arrangement will then be undertaken to have the mine placed under general operation.

Victory Silver.

At the time of dispatching this letter to the Journal a report has just been obtained that a large vein of exceptionally good promise has been encountered on the Victory Silver Mines.

VANCOUVER MEETING C. I. M. & M.

H. Mortimer-Lamb, secretary of the British Columbia Division of the Canadian Institute of Mining & Metallurgy, reports that arangements for the annual meeting to be held at Vancouver B. C. from the 13th to the 15th of February, are well in hand. One Session is to be devoted to the topic of prospecting and its encouragement, in which connection information will be presented regarding areas in the Province as yet unprospected and papers read on such themes as "aerial photography as an aid to the prospector" and the "diamond drill is a means of prospecting ore bodies." Coal mining also is to be given special consideration while the treatment of complex ores, a problem always before the operators of British Columbia, will be dealt with by W. G. Woolf, of the Bunker Hill & Sullivan Mining & Concentrating Co. M. Y. Williams will read a paper on the "Oil Possibilities of the Mackenzie River."

Mr. Harry Kee, manager of Kerr Lake mine, is in New York.

TIN IN NEW MEXICO.

Tin is found in a rather out-of-the-way part of New Mexico, from 60 to 80 miles by road southwest of Magdalena, in a high plateau country. It occurs as the oxide, cassiterite, in small scattered veinlets in rhyolite and as nuggets and grains in the gravels of the streams. The United States Geological Survey, Department of the Interior, has just issued, as Bulletin 725 G, a report by J. M. Hill entitled the "Taylor Creek tin deposits, New Mexico," which describes the deposits in detail. There is undoubtedly considerable tin in the district, but it is so dispersed through the rocks that profitable exploitation of the deposits under existing conditions is rather doubtful.

DRILLING WITH LOW-PRESSURE GAS.

The results of the investigation made by the United States Bureau of Mines, at the Petroleum Experiment Station, Bartlesville, Okla., in cooperation with the Osage Oil and Gas Lessees Association and the Mid-Continent Oil and Gas Association, relative to the use of low-pressure gas in oil field boilers for drilling purposes, have been incorporated in a report printed by the last-named association as a part of its Year book. Copies of the report may be had by applying to the Mid-Continent Oil and Gas Association, 506 Cosden Building, Tulsa, Okla.

British Columdia Letter

To glance at the extent and the methods of taxation of operating mines in British Columbia by the Provincial Administration is interesting at this time. The claim is made by some that the industry is hampered by these taxes, but an analysis would seem to indicate that the burden is placed where it can best be borne. Properties that have come to stand firmly on their own feet are affected. It is a matter outside the scope of this article to enumerate the measures taken to encourage the development of mineral claims to the point of economic independence.

All mines are subject to a tax upon income subject to certain exemptions and allowances. In the case of mines paying an output tax this income tax is collected only if it proves greater than the output tax. The output tax then is regarded as part payment of the income tax. In addition to the ordinary working expenses metalliferous mines are permitted to deduct from their incomes charges under various other heads. These may be enumerated and explained as follows: 1.—Development, the allowance granted for such work being the proportion of the capital expenditure in the course of the year's operations which may be considered properly to have been used in this form of work. That substantial sums must be invested continually in the operation of any mine to the end that its resources may be opened up according to the best mining practice, thus assuring the maximum ultimate return and a continuous supply of ore during the life of the property, is everywhere recognized. The Provincial Government has admitted the soundness of the principle that allowance should be made for this form of expenditure in figuring annual assessments. 2.—Depreciation, an allowance under this classification being made on buildings and plant. 3.—Depletion, the amount allowed being estimated to be such proportion of the capital cost of the mine as, by reason of its being a wasting asset, may be chargeable to the year's operations. It is specified that these allowances are made at the discretion of the Minister of Finance, subject, however, to an appeal to the Lieut Governor in Council.

One of the oldest mining taxes in British Columbia is the Output Tax, under the terms of which all mines other than coal or gold, are subject to a tax, payable quarterly, of 2 per cent on the gross value of ore, less cost of transportation from the mine to the reduction plant and the cost of treatment at the reduction plant. Any such mine, other than a placer mine, not realizing on ore shipments market value of $5,000 in any one year is entitled to a refund of one half the tax paid.

Iron mines, in addition to the 2 per cent tax, are subject to a tax of 37 1-2 cents per ton on their output but, under the Bounty Act, this is more than returned by a substantial margin. This measure provides that the Provincial Treasury will pay $3.00 for every ton of pig iron manufactured in the Province from provincial ore and $1.50 for every ton of pig produced in the Province from foreign ore.

The Mineral or Output Tax does not apply to gold mines. A mine is considered a gold mine when the market value of the gold recovered from the ore is 85 per cent or more of the gross value of the metal content of such ore.

Coal is subject to a tax of 10 cents per ton of 2240 pounds, with the exception of such coke as is shipped to coke ovens within the Province. There is a tax of 10 cents per ton on coke, the only exemption being in cases where the tax has been paid on the coal used for its production. A tax, also, is levied on coal lands, that from which coal is being mined being taxed at 1 per cent on the assessed value in addition to any other ordinary tax.

With regard to taxation on unworked mining property, Crown Granted Mineral Claims, upon which $200.00 worth of development work has not been done during the preceding twelve months are subjected to a land tax of 25 cents per acre. Unworked coal lands are taxed at the rate of 1 per upon the assessed value.

Premier mine.

Stewart, B. C.—Dale L. Pitt, superintendent of the Premier Mine Salmon River, is quoted as stating that the new aerial tramway now is handling 100 tons per day. Later it is planned to double the amount now delivered at the dock at Stewart, lower grade ore being shipped to the smelter at Anyox. At present the ordinary shipments the Premier is sending out 100 tons of concentrate a month, the ore being the result of its stamp mill.

Homestake.

Anyox, B. C.—The Homestake Mining Company, operating the recently acquired development property on the Kitsault River, is making [illegible] during the month of March. A total [illegible] is to be shipped to the smelter.

Granby Consolidated

Anyox, B. C.—U. S. Motor, general manager of the Granby Consolidated Mining and Smelting Co., returning from a visit to New York and other points in the United States, announced that the Company is planning the construction of an [illegible] concentrator, [illegible] at an estimated cost of $250,000. The equipment present power mode and [illegible]

at all seasons. There are some 930 men employed at Anyox, the Company's industrial centre, and the production per month averages 2,500,000 lbs. of copper. When copper reaches 14 cents a lb. there will be a general increase of wages averaging 60 cents a day, according to the agreement now in effect and which expires on the 1st of April. Mr. Munro denies the report that it is the intention of the Company to build a smelter at Stewart.

Kootenay Needs Ore Testing Plant..

Nelson, B. C.—L. H. Biggar, manager of the Ottawa Mine near Slocan City, speaking recently of the need for an Ore Testing Plant in the Kootenay Districts of this Province, said that he was convinced that the zinc could be eliminated from the silver-lead-zinc ores of this section and that the process worked out by the Consolidated Mining and Smelting Co., in the treatment of the product of the Sullivan Mine could be applied to small properties. The latter could be made profitable by an adaptation of this method. There was a large tonnage of silver-lead ore that could be worked with good return by the elimination of the zinc. A plant of the kind wanted could be obtained for between $30,000 and $40,000.

Ore Receipts At Trail.

Trail, B. C.—A total of 26,267 tons of ore and concentrates have been received at the Trail Smelter of the Consolidated Mining and Smelting Co., for the first three weeks of January. Of this amount 25,371 tons are from the Company Mines. There have been thirteen independent shippers since the beginning of the new year, whose aggregate shipments have reached 886 tons. Six of the latter are in the Slocan District.

Rebuilding At Britainnia.

Vancouver, B. C.—The work of re-establishing the buildings and plant of the Britainnia Mining and Smelting Company, which have been wiped out by fire and flood, is under way. Not many months will be taken in bringing back to Britannia Beach its former appearance of bustling activity and productivity. The Canadian Northwest Steel Company, of Vancouver, B. C., has the contract for the supply and the fabrication of the steel frame work of the concentrator. Messrs. Hodgson, King, and Marble, also of Vancouver, have been given the work of rebuilding a railway bridge that was destroyed. The supervision of the erection of the concentrator will be in the hands of Mr. Richard Trench, who has had experiences in similar work at Trail, B. C., and who expects to be able to start on his task early next March. The new mill site is on the slope of the mountain side, a short distance to the west of the former situation of that which was destroyed. J. L. Walsh, a construction engineer of San Francisco, Cal., has been retained by the Company, as consulting engineer in its re-building program. E. J. Donohue, general manager of the Britannia Mines, is in general charge of work at the mines as well as of the re-construction operations.

Discovery in White Water District.

The reported richness of recent discoveries in the White Water District, B.C., has directed attention to the Bridge River, Lillooet, and to the country through which it flows. Prospectors believe that it has possibilities for the placer miner. There has been mining on this waterway, both lode and placer, the latter in various forms, for many years. Those engaged have had more or less success but there have been no late reports of big returns. This is not to be taken as a slur because there are properties in the Bridge River zone that have promise and of the future of which their owners, no doubt with justification, have every confidence. But it was the find of recent months, in the White Water Country, that has caused the miners' eyes to dwell with interest upon this part of the provincial interior. A prospector named Taylor located on Iron Creek. He developed his claims, took out considerable gold, and also a quantity of what has been termed tellurides. Whether the latter term is correct has yet to be determined. There seems to be no [illegible] however, that he has a good prospect. Others already have staked next to and all around him and as soon as the season opens there will be a considerable movement through Lillooet, over the mountain passes and into the valley of promise beyond.

MINING QUOTATIONS.

Quotations on Active Stocks on Standard Stock Exchange, Toronto, for week ending Feb.6th.1922.

	High	Low	Last
Silver.			
Adanac Silver Mines, Ltd.	1 ¼	¾	¾
Bailey	2 ¼	2	2
Beaver Consolidated	20	18	19
Chambers-Ferland	2 ½	2 ½	2 ½
Coniagas	1.35	1.35	1.35
Crown Reserve	12	10 ½	12
Gifford	½	½	½
Kerr Lake	3.10	3.00	3.00
La Rose	35 ¼	33	33
McKin.-Dar.-Savage	18	16	17
Mining Corp. of Can.	1.05	1.00	1.05
Nipissing	6.25	6.10	6.10
Ophir	1	1	1
Peterson Lake	5 ¼	4 ⅞	4 ⅞
Temiskaming	34	30	31 ¾
Trethewey	6 ¾	5 ¼	6 ½
Gold.			
Apex	1 ½	1 ½	1 ½
Atlas	14 ¼	9 ¼	11
Dome Lake	6	6	6
Dome Mines	24.00	22.00	24.00
Gold Reef	2	1 ⅞	1 ⅞
Hattie Gold M. Ltd.	20	20	20
Hollinger Cons.	8.25	7.93	8.25
Hunton Kirkl'd G.M.	6 ¾	6 ¼	6 ¾
Keora	10	8 ¾	8 ¾
Kirkland Lake	32	29	29
Lake Shore M. Ltd.	1.40	1.32	1.35
McIntyre	2'44	2.35	2.42
Moneta	12	10	10 ½
Newray Mines, Ltd.	7	6 ⅞	7 ¼
West Dome	7	6	6
Porcupine Crown	16	13	14 ¾
Porcupine V.N.T.	20 ¾	17	19 ½
Preston East Dome	3 ¼	2 ¾	2 ¾
Schumacher	35 ¼	33	33
Sokeora	29 ½	25	29
Teck-Hughes	29 ½	26 ½	28 ½
Thompson Krist	2	1 ⅞	2
West Tree Mines Ltd.	2 ½	2 ½	2 ½
Wasapika Gold M. Ltd.	3	2 ½	2 ½
Miscellaneous.			
Petrol Oil	18	18	18
Rockwood Oil, Gas	½	½	½
Vacuum G.	2	1 ⅞	1 ⅞

Mr. H. S. Munro, manager of Granby Consolidated, has returned to Anyox after a visit to New York.

The Canadian Miners' Buying Directory.

Acetylene Gas:
Canada Carbide Company, Ltd
Prest-O-Lite Co. of Canada, Ltd

Acetylene Welding:
The Toronto Iron Works, Ltd.

A.C. Units:
Powley & Townsley, Limited.

Agitators:
The Dorr Co.
Can. Chicago Bridge & Iron Co., Ltd.
Horton Steel Works, Limited.

Air Compressors:
Bellliss & Morcom, Ltd.
Laurie & Lamb
Sullivan Machinery.

Air Hoists:
Canadian Ingersoll-Rand Co., Ltd
Mussens, Limited.

Air Receivers:
The Toronto Iron Works, Ltd.

Alloy and Carbon Tool Steel:
Peacock Brothers Limited.

Alternators:
MacGovern & Co.

Aluminium:
Spielman Agencies, Regd.

Amalgamators:
Northern Canada Supply Co.
Mine and Smelter Supply Co.
Wabi Iron Works.

Antimony:
Canada Metal Co.

Antimonial Lead:
Pennsylvania Smelting Co.

Assayers' and Chemists' Supplies:
Dominion Engineering & Inspection Co.
Lymans, Limited
Mine & Smelter Supply Co.
Pennsylvania Smelting Co.
Stanley, W. F. & Co., Ltd.

Ash Conveyors:
Canadian Link-Belt Company

Ashes Handling Machinery:
Canadian Link-Belt Co., Ltd.

Assayers and Chemists:
Milton L. Hersey Co., Ltd.
Campbell & Deyell
Ledoux & Co.
Thos. Heys & Son
C. L. Constant Co.

Asbestos:
Everitt & Co.

Balls:
Hull Iron & Steel Foundries, Ltd
Peacock Brothers Limited.
The Wabi Iron Works.
The Hardinge Conical Mill Co
The William Kennedy & Sons, Ltd.

Ball Mills:
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd
Mine & Smelter Supply.
The Wabi Iron Works.
The William Kennedy & Sons, Ltd.

Babbit Metals:
Canada Metal Co.
Hoyt Metal Co.

Ball Mill Feeders:
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd
Mine & Smelter Supply.

Ball Mill Linings:
Hardinge Conical Mill Co
The William Kennedy & Sons, Ltd
Peacock Brothers, Limited
Hull Iron & Steel Foundries, Ltd
Mine & Smelter Supply.

Balances — Assay & Analytical:
Mine & Smelter Supply.

Belting—Leather, Rubber and Cotton:
Canadian Link-Belt Co., Ltd
Northern Canada Supply Co
Jones & Glasco.

Belting:
R. T. Gilman & Co
Gutta Percha & Rubber, Ltd.

Belting—Silent Chain:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal
Jones & Glassoo (Regd.)

Belting (Transmission):
Goodyear Tire & Rubber Co

Belting (Elevator):
Goodyear Tire & Rubber Co

Belting (Conveyor):
Goodyear Tire & Rubber Co
Gutta Percha & Rubber, Ltd.

Bins and Hoppers:
The Toronto Iron Works, Ltd.
Can. Chicago Bridge & Iron Co., Ltd.
Horton Steel Works, Limited.

Blasting Batteries and Supplies:
Canadian Ingersoll-Rand Co., Ltd
Mussens, Ltd.
Canadian Explosives, Ltd.
Powley & Townsley, Limited.

Bluestone:
The Consolidated Mining & Smelting Co
The Conlagas Reduction Co., Ltd.

Blowers:
Canadian Fairbanks-Morse Co., Ltd
Northern Canada Supply Co.

Boilers:
Canadian Ingersoll-Rand Co., Ltd
Marsh Engineering Works
R. T. Gilman & Co.
The John Inglis Company
Wabi Iron Works.

Blue Vitriol (Conlagas Red):
Canadian Fairbanks-Morse Co., Ltd.

Bortz and Carbons:
Diamond Drill Carbon Co.

Boxes, Cable Junction:
Standard Underground Cable Co. of Canada Ltd
Northern Electric Co., Ltd.

Brazilian Rough Diamonds:
Diamond Drill Carbon Co

Brazilian Mica:
Diamond Drill Carbon Co

Buggies, Mine Car (Steel)
Hendrick Manufacturing Co

Brazilian Ballas:
Diamond Drill Carbon Co

Brazilian Rock Crystal:
Diamond Drill Carbon Co.

Brazilian Tourmalines:
Diamond Drill Carbon Co

Brazilian Aquamarines:
Diamond Drill Carbon Co.

Bridges—Man Trolley and Hope Operated—Material Handling
Canadian Mead-Morrison Co., Limited

Bronze, Manganese, Perforated and Plain:
Hendrick Manufacturing Co.

Buckets:
Canadian Ingersoll-Rand Co., Ltd
R. T. Gilman & Co
Hendrick Manufacturing Co.
Canadian Link-Belt Co., Ltd
Marsh Engineering Works
Mussens, Ltd.
MacKinnon Steel Co., Ltd
Northern Canada Supply Co.
The Wabi Iron Works

Buckets, Elevator:
Canadian Link-Belt Co., Ltd
Hendrick Mfg. Co
Peacock Brothers Limited.

Cable—Aerial and Underground:
Canada Wire & Cable Co
Northern Canada Supply Co
Standard Underground Cable Co. of Canada Ltd
Peacock Brothers, Limited

Cableways:
Canadian Mead-Morrison Co., Limited
Fraser & Chalmers of Canada, Ltd
Mussens, Ltd.
The Wabi Iron Works
R. T. Gilman & Co.

Cages:
Canadian Ingersoll-Rand Co., Ltd Montreal Que.
Northern Canada Supply Co
Fraser & Chalmers of Canada, Ltd
The Mine & Smelter Supply Co
Mussens, Ltd.
The Wabi Iron Works

TWO FLOWING WELLS OPENED AT LA PAZ.

Toronto. — Col. J. F. H. Usher, of Toronto, who has recently completed a tour of inspection of the properties of the La Paz Oil Corporation, in Mexico, returns with a report which will be gratifying to a large number of Canadian stock holders. Early operations in the Tepila district have been most successful. Two flowing wells have been opened, and the output sold to the Pierce Oil Co. of New York. Col. Usher points out that at the contract price the company's annual revenue from these two wells alone should approximate $600,000 or the equivalent of 5 per cent on the par value of the capital outstanding. A contract for a new well in lot 11 in the Zacamixtle district adjoining Topila has been let, and drilling will be commenced in the course of a few days.

As a result of the recent appointment of the English directors to the board, $1,000,000 additional capital will become available almost immediately, and will enable the company to undertake development and production on a more elaborate scale. Other drilling contracts, he added, were pending.

Representations have been made to the Mexican Government, Colonel Usher stated, during the course of the past few weeks on the part of British and American oil interests, with a view to the adjustment of certain points of difficulty to the trade, arising chiefly out of the recent heavy increase in the export tax on oil. As a result of this meeting, there was ground for hope that the tax would be either completely removed or extensively modified.

U. S. COPPER IN 1921.

The smelter production of copper in 1921 from ore mined in the United States, as shown by the actual production for the first eleven months and by estimates made by smelting companies for December, was about 461,000,000 pounds, according to a report by H. A. C. Jenison of the United States Geological Survey, Department of the Interior. The refinery production as similarly shown was about 601,000,000 pounds from domestic material and about 320,000,000 pounds from foreign material. According to the records of the Department of Commerce the total imports of copper for the first eleven months of the year in ore, concentrates, matte, blister, and refined copper were about 318, 000, 000 pounds, of which about 68, 000,000 pounds was refined copper and 157,000,000 pounds was blister copper. The exports for the first eleven months totaled about 567,000,000 pounds, of which about 538, 000,000 pounds was new refined copper and 29, 000,000 pounds was manufactured -- wire, rods, pipes, tubes, sheets, etc.

The total new supply of primary refined copper for the year was about 989,000,000 pounds, which includes refined copper produced from foreign and domestic material as well as imported refined copper. The stocks of refined copper in the hands of domestic refineries on December 31, 1921, excluding those in transit, as estimated by the refining companies, were about 496,000,000 pounds.

SALES OF IRON ORE.

Halifax. — In an interview tonight, R. M. Wolvin, president of the British Empire Steel Corporation, who returned on the Empress of Scotland on Sunday, said that while in Germany and England he had been negotiating for sales of iron ore from the Wabana Mines, and felt the negotiations would result in satisfactory business in the future. "In Britain business conditions have improved very greatly during the year, and British export trade is increasing," Mr. Wolvin said.

"In Germany there is little evidence of unemployment and the condition of the people seems reasonably satisfactory. The German steel industry is working to about 60 per cent. of capacity, and would do better if it were not that Germany has to make deliveries of coal to France. Skilled workmen in Germany now receive 100 marks per day, equivalent to fifty cents in Canadian currency."

PLACER GOLD YIELD IN YUKON.

Production of placer gold in the Yukon, Canadian territory, during 1921, was valued at roughly $1,250,-000, according to government reports based on collection of royalties in Dawson. This is larger by nearly $20,000 than the yield for 1920.

The large dredge and hydraulic plants, working the creeks within a fifty-mile radius of Dawson, are responsible for most of the output. The Highest Creek dredge in the Mayo district, and rich new pay-streaks in the old Miller Glacier districts added considerably to the year's yield.

A special issue of the Dawson News, dealing extensively with the mining situation in the Yukon, claims that the year's showing proves the Klondike the most durable of all northern placer camps, while new dredging operations assure the district of at least twenty-five more years of activity similar to that of 1921. General Manager Wheeler, of the Alaska, White Pass & Yukon Railway, recently stated that the Mayo district was likely to develop the richest silver mines on the continent.

OIL PRODUCTION IN DERBYSHIRE.

According to figures which have been furnished by the Petroleum Department, the production of crude oil for the past year at the Hardstoft well, near Chesterfield, amounted to 2,652 barrels, or 342 tons. These figures compare with 2,909 barrels, or 375 tons, for the previous year. The total output of the Hardstoft well from the time it was brought in until the end of last month amounted to 932 tons. The well was pumped from April 10th to July 24th last year, after which it was again allowed to flow under its own pressure. The operations at the D'Arcy well have been recently recommenced, the well having been shut down for a considerable time during the past summer on account of water shortage. The total depth now reached is 1,-237 ft., and much difficulty is still experienced on account of the caving of the strata, it being necessary to under-ream the hole and follow with the casing as soon as possible after the drill.— Petroleum Times.

In the course of the investigation being conducted at Pittsburgh, Pa., by the U. S. Bureau of Mines and the American Society of Heating and Ventilating Engineers with reguard to the effects of temparature and humidity on workers in both the mining and non-mining industries, an experimental room has been prepared in which the walls are insulated by about four inches of cork. Apparatus for refrigerating, heating and controlling the moisture and air movements have been installed.

Canadian Miners' Buying Directory.—(Continued)

Cables—Wire:
Standard Underground Cable Co of Canada, Ltd.
Canada Wire & Cable Co.
R. T. Gilman & Co.

Cable Railway Systems:
Canada Wire & Cable Co.

Cam Shafts:
Hull Iron & Steel Foundries, Ltd.
Peacock Brothers Limited.

Car Dumps:
Sullivan Machinery Co.
R. T Gilman & Co.

Carbide of Calcium:
Canada Carbide Company, Ltd.

Cars:
John J. Gartshore
MacKinnon Steel Co., Ltd.
Northern Canada Supply Co.
Marsh Engineering Works
Peacock Brothers, Limited
Mussens, Limited
Powley & Townsley, Limited.
R. T. Gilman & Co.

Car Wheels and Axles:
Canadian Car Foundry Co., Ltd.
Burnett & Crampton
Hull Iron & Steel Foundries, Ltd
John J. Gartshore
Marsh Engineering Works, Ltd.
Peacock Brothers Limited.

Carriers (Gravity):
Jones & Glassco

Castings—Brass
The Canada Metal Co., Ltd

Castings (Iron and Steel)
Hull Iron & Steel Foundries, Ltd
Peacock Brothers Limited
The William Kennedy & Sons, Ltd.

Cement Machinery:
Hadfields, Limited
Hull Iron & Steel Foundries, Ltd.
Burnett & Crampton

Chains:
Jones & Glassco
Northern Canada Supply Co.
Canadian Fairbanks-Morse Co., Ltd
Canadian Link-Belt Co., Ltd.
Greening, B., Wire Co., Ltd.

Chain Drives:
Jones & Glassco (Regd.)

Chain Drives—Silent and Steel Roller:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal (
Jones & Glassco) Regd.).

Chemical Apparatus:
Powley & Townsley, Limited.

Chemists:
Canadian Laboratories
Campbell & Deyell
Thos. Heyes & Sons
Milton Hersey Co.
Ledoux & Co.
Constant, C. L. Company

Chrome Ore:
The Electric Steel & Metals Co
Everett & Co.

Classifiers:
Mussens, Limited
Fraser & Chalmers of Canada, Ltd
The Wabi Iron Works
R. T. Gilman & Co.
The Dorr Company

Clutches:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal (

Coal:
Dominion Coal Co.
Nova Scotia Steel & Coal Co

Coal Cutters:
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd
Peacock Brothers, Limited

Coal Crushers:
Canadian Mead-Morrison Co., Limited
Canadian Link-Belt Co., Ltd
Peacock Brothers Limited

Coal Mining Explosives.
Canadian Explosives, Ltd
Giant Powder Company of Canada, Ltd

Coal Mining Machinery:
Canadian Rock Drill Co
Denver Rock Drill Mfg. Co. Ltd
Canadian Ingersoll-Rand Co., Ltd
Sullivan Machinery Co.
Marsh Engineering Works
Hadfields, Ltd.
Hendrick Mfg. Co.
Powley & Townsley, Limited.
Mussens, Limited

Coal and Coke Handling Machinery
Canadian Link-Belt Co., Ltd.
Powley & Townsley, Limited.

Coal Pick Machines:
Sullivan Machinery Co.

Coal Screening Plants:
Canadian Link-Belt Co., Ltd.

Cobalt Oxide:
Coniagas Reduction Co
Everitt & Co.

Compressors—Air:
Smart-Turner Machine Co.
Canadian Ingersoll-Rand Co., Ltd
Mussens, Limited
Peacock Brothers, Limited

Concrete Mixers:
Gould, Shapley & Muir Co., Ltd
MacGovern & Co., Inc
Mussens, Limited

Condensers:
Smart-Turner Machine Co.
Northern Canada Supply Co
Belliss & Morcom, Ltd.
Laurie & Lamb
Peacock Brothers, Limited

Concentrating Tables:
The Mine & Smelter Supply Co
Deister Concentrator Co.

Converters:
Northern Canada Supply Co
MacGovern & Co., Inc.

Conveyors—McCaslin Gravity Bucket:
Canadian Mead-Morrison Co., Limited

Contractors' Supplies:
Canadian Fairbanks-Morse Co., Ltd.

Consulters and Engineers:
Hersey Milton Co., Ltd

Conveyors:
Canadian Link-Belt Co., Ltd
Jones & Glassco (Regd.)
Powley & Townsley, Limited

Conveyor Belts:
Gutta Percha & Rubber, Ltd

Conveyor Flights:
Canadian Link-Belt Co., Ltd
Hendrick Mfg. Co., Ltd

Conveyor—Trough—Belt:
Canadian Link-Belt Co., Ltd
Hendrick Mfg. Co
Mussens, Limited
Jones & Glassco (Roller Belt and Chain)
Hendrick Mfg. Co.

Conical Mills:
Hardinge Conical Mill Co

Copper:
The Canada Metal Co. Ltd
Consolidated Mining & Smelting Co

Couplings:
Hans Renold of Canada, Limited, Montreal

Cranes:
Canadian Mead Morrison Co., Limited
Canadian Link Belt Company
Peacock Brothers, Limited
R. T. Gilman & Co
Smart Turner Machine Co

Crane Ropes:
Allan Whyte & Co
Canada Wire & Cable Co
Greening B. Wire Co., Ltd
Peacock Brothers, Limited

Cyanide:
The Mine & Smelter Supply Co

Crusher Balls:
Canada Foundries & Forgings, Ltd
Hull Iron & Steel Foundries, Limited Hull
Osborn, Sam'l (Canada) Limited
Peacock Brothers, Limited
Swedish Steel & Importing Co., Ltd

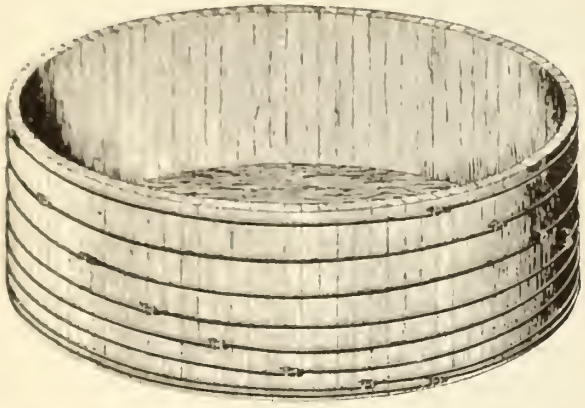
Crushers:
Canadian Steel Foundries, Ltd
Hull Iron & Steel Foundries, Ltd
Hardinge Conical Mill Co
Lyman's Ltd
Mussens Limited
Osborn, Sam'l (Canada) Limited
The Electric Steel & Metals Co, Ltd
R. T. Gilman & Co

ONTARIO WIND ENGINE & PUMP CO. LIMITED

TORONTO

MINING

TANKS



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Toronto Mining Tanks can be supplied in B. C. Fir, Redwood, Gulf Red Cypress and White Pine. The staves are made of 2" or 3" stock, surfaced two sides, sawn radially to insure tight joints. Bottoms are also 2" or 3" stock, surfaced two sides, jointed and dowelled for maximum strength. The hooping is extra strong, of round wrought iron construction up to 7/8" size and over that of steel. These are joined by lugs of extra heavy design. All our Tank stocks are **air dried** to give them longer life.

Let us furnish estimates on any Tanks you require. Our Tank booklet is free on request.

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For Any Industrial Purpose.

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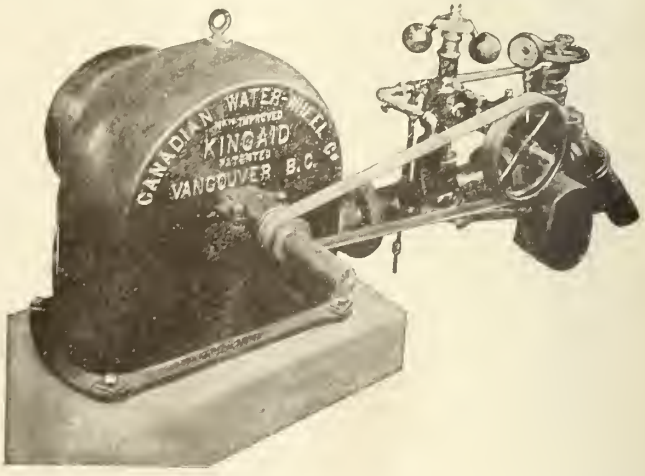
It unloads cars and barges, excavates with dragline, clam-shell or orange peel, is ready for a quick change to hook, skip, magnet or pile-driver, and it moves from job to job under its own power.

MUSSENS LIMITED

MONTREAL TORONTO
WINNIPEG VANCOUVER



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CANADIAN WATER WHEEL CO., Ltd., Vancouver, B.C.

Wokrs: Granville Island

Agents for PETERSON FLOTATION CELL

EDITORIAL

EDUCATION OF PROSPECTORS.

The prospector is, to the average citizen, and even to the average mining man, rather an enigma. What is it that induces him to eschew the comforts of civilization, brave the black flies and mosquitoes, and, worst of all, try to assimilate the products of his own culinary efforts? Surely he cannot really enjoy being dirty and fly-bitten, without company or entertainment, cut off from music, books and all the amenities of life. Can hope be the well-spring of his effort? Hope has been dashed so often and deferred for so long that surely it must be gone by now. Whatever, it may be that converts a normal human being into a prospector, we may be thankful that there are still a few hear the call of the wild woods each spring, and feel the lure of discovery.

Our prospectors are, so far as is humanly possible, the creators of our mineral deposits. The whole structure of our mining industry is built upon their efforts. This statement is almost trite; but few even in the mining profession realize what it implies, sufficiently clearly to formulate the corollary. If our mining industry depends primarily upon the prospector, then it is the business of those interested in the industry to try by all possible means to make the prospector's work effective. Mr. Mandy points out, in this issue, a number of ways in which we can aid this prime mover of our mineral industry, and in which he is aided in British Columbia. Here, we will mention an educative effort that is being exerted by the Ontario Department of Mines.

Realizing that the prospectors of the province are few (all too few), and that they can be readily reached in a comparatively small number of centres on the edge of the woods during the winter season, the Department has decided to put in their way the means of elementary education in their calling. There was a precedent for this in the summer Prospectors' classes that were conducted throughout the province fifteen to twenty years ago.

During the winter of 1920-21, and again this winter, free classes in elementary mineralogy and a short course of lectures on geology, lasting for ten days, have been held at selected points, under the direction of Dr. W. L. Goodwin. To indicate the practical nature of the instruction, it may be mentioned that a set of about 75 minerals and rocks, appropriately labelled and described, is presented to each man (or woman) that attends the class. There have been found, still in use by prospectors, similar sets of minerals distributed fifteen years ago. Thus, at the expense to the public of a few thousand dollars, the prospectors of the province are provided with a chance to acquire a sound grounding in their trade.

What further can be done for the prospector? This is only a beginning. Our mining industry is second only to agriculture in magnitude and importance. The education of the tiller of the soil requires, in the estimation of the public, sums that constitute a fat slice of the provincial revenue. In fact, the farmers are almost embarrassed by the attentions of those who would educate them more highly. There are agricultural colleges, experimental farms, dairy schools, cheese inspectors, potato inspectors, bureaus for information and propaganda, public nurseries, and we know not what else beside. Against this we have a lone teacher for prospectors. We must improve upon this.

Advanced courses of instruction may be expedient, to follow the course already provided. On the other hand, instead of taking the facilities to the prospector, he may wish to come and get them. A certain proportion are sure to have sufficient initiative and general education to allow of instruction on the correspondence school plan. This will involve the writing of suitable texts and the provision of the personal supervision required. There must be numerous devices to be found for the seeking whereby the summer's grind of our average bush-whacking prospector can be made more

effective. When effective devices have been formulated, we can confidently expect from our provincial governments the wherewithal to put them into effect.

THE FEDERAL DEPARTMENT OF MINES.

The "Engineering and Mining Journal comments, in its number of Fernary 4th, upon the need for organization among miners, and states that "our continued survey of the situation reveals that the mining industry has great need of being mothered: not coddled, but given a fair chance with the rest." Our contemporary advocates the establishment of a Department of Mines. Evidently there is lacking in the United States mining industry something that is also lacking here. We have a Department of Mines, but our Governments have not endeavored to find a Minister who would give his best efforts to further the development of mineral resources. The Ministry of Mines is little more than a name and the mining industry is not properly represented at Ottawa. The men who are called Ministers of Mines, and there have been many of them in the past twenty years, are not expected to give much attention to mining; for they are loaded with other work that occupies most of their time.

It has been pointed out by the secretary of the Canadian Institute of Mining and Metallurgy, Mr. Geo. C. Mackenzie, that our Department of Mines cannot itself improve its circumstances. "It is a collection of civil servants who are not expected to express pronounced views on matters of government policy." Mr. Mackenzie suggests that the Institute should assert itself and convince our Governments that the industry is deserving of considered recognition. If the Institute were broadened out and developed so that it adequately represented the industry it would to some extent supply that element which is lacking here and which our contemporary finds need of in the United States.

The immediate need is to make the Institute really representative of the industry, rather than of any group of those connected with the industry. This matter we are pleased to see is being given serious attention by the Council of the Institute. The Institute does represent the industry at present, but not as well as it should. To make it truly representative is something worth striving for: then the needs of the industry can be more effectively brought to the attention of Governments. The Department of Mines could be materially helped by the activity of such an Institute.

CAPITAL STOCK REDUCTION FOR MINING TOWNS.

The useful life of a mining town is ordinarily limited by the life of the mines it serves. They grow, flourish and wane in proportion to the work of mineral extraction that is current. So we have booms, periods of prosperity and depression, and finally and inevitably extinction, in both cases.

Sound mining finance now includes provision for the inevitable. The latest and most striking example of this is the capital stock reduction of the Dome Mines, application for which is now before the Provincial authorities. Are those who are guiding the destinies of the corresponding mining camps equally wise? Apparently not. Dawson City, though sadly diminished from its former glory, is still the centre of a substantial mining operation; yet it is in a chronic state of indebtedness, inherited from the expenditure and expansion of boom days. The town of Cobalt, surrounded by mines past the zenith of their production, is beginning to look for outside financial aid.

Certain members of the mining fraternity, and others holding public offices, are in a position to influence the financial operations of corporate mining communities, by personal influence, propaganda, and the enactment of public or private regulations. It might be well for these to consider the advisability of inducing or enforcing the reduction of the public debt of mining communities, as a natural sequel to the reduction of the capital stock (or similar expedient) of the mines. This may not appear to be a logical part of the duties of those suggested as responsible; but as it would without doubt be to the general public benefit, and would react favourably upon the mining industry as a whole, it seems probable that a place could be found for such regulative supervision as would conserve public (and private) resources without undue restriction of personal liberties.

THE OTTAWA MEETING.

The annual meeting of the Canadian Institute of Mining and Metallurgy will be held at Ottawa March 1st, 2nd and 3rd. The business and technical sessions will be held at Victoria Museum where the facilities are better than in the ordinary places of meeting. There will be excursions through the Royal Mint, through the new Parliament Buildings and through the plant of the British America Nickel Corporation at Deschesnes, as well as an excursion to the Kingdon Mining, Smelting and Manufacturing Company's lead mine at Galetta. The various laboratories of the Department of Mines will be open for inspection by members and their friends. Among the entertainments will be a smoker and concert in the Palm Room, Chateau Laurier, on Wednesday evening. The annual dinner will be held on Thursday evening at the Chateau. A ladies' Committee is arranging a special program of entertainment for the wives and friends of visiting members.

A special effort has been made to secure deliberate discussion of papers presented at the meeting. A large number of these papers have already been published in the Institute Bulletin and members have thus an opportunity to discuss the papers intelligently, there being opportunity to read and study the papers prior

to their presentation at the meeting. The papers are of diverse character, covering a variety of subjects and it is not to be expected that all members will be interested in all the papers; but a discussion carried on by members well-informed on a subject is listened to with much interest by all. The attempt being made to bring out such discussoin will be heartily approved of.

The report of council shows that the officers of the Institute were unusually active during the year. The Secretary visited over fifty different localities and attended twenty branch meetings throughout the country. The Council advises that an annual tour of branches by the Secretary would be most valuable in strengthening the bonds between headquarters and branches, kindling active interest in the Institute and thereby increasing membership.

Among the matters in which the Institute has shown an interest during the year were: Engineering Legislation, A Dominion Mines Act and Nickel Coinage. A ballot of Ontario members is being taken to obtain an expression of opinion on the proposed Engineering Legislation. After the result of the Federal election was announced, President C. V. Corless on behalf of the Institute brought to the attention of Hon. W. L. Mackenzie King, the claim of the mining industry for representation in the Cabinet.

The report of the Finance Committee shows that the expenditures for the year exceeded the revenue by $5,-441. This, the committee points out, resulted from the expressed opinion of members that the Institute should take a more active interest in the affairs of the Industry and also get in closer touch with the Branches. With this in view the salary of the secretary was increased $2,000 was allowed for travelling expenses and salaried editors were appointed. These extra expenses account for practically all the excess expenditure. This report indicates that the Institute is not able to long continue such work unless some way is found to lessen expenses and increase revenue. Consequently it is hoped that there will be at the Ottawa meeting full discussion of this report and of the secretary's paper on Institute Policy. It is to be hoped that a way will be found to permit the continuance of the activities of the Institute on the present scale. In our opinion, the view voiced by Mr. Mackenzie, that to be effective the Institute must be made more truly representative of the Industry, should be supported.

EDITORIAL NOTES

Ottawa to Hull, and Return.

It has been announced that the committee in charge of arrangements for the Annual Meeting of the C. I. M. M. in Ottawa have provided for tobogganing from the Chateau to Hull. We trust that this will not result in any casualties, and that there has been provided, for the convenience of sliders, an elevator for the return trip.

The Prospector's Notebook.

The habitual failure of the prospector to transfer his daily experience to a note book is due to two causes. One is inability, the other is indifference. It is morally obligatory upon a man who is grub-staked to render an accounting of what he has done. He should be able to do this through the medium of daily notes and continuous itinerary and local sketches. Such records are of value, whatever the results of the search for valuable minerals may happen to be.

Nota bene, readers who are prospectors, or who are responsible for prospectors.

Engineering Legislation.

In the "Northern Miner" of February 4th the proposed Engineering Legislation is discussed by Mr. Geo. R. Rogers of Toronto. Mr. Rogers is quite evidently of the opinion that the proposed legislation is both unnecessary and undesirable.

The peculiar feature of the agitation for this class legislation is that most publicly expressed opinions are against it. If there are any mining engineers in favor of it, they are evidently of the opinion that arguments in favor of the proposal are unnecessary.

It is possible that the lack of interest in the legislation will result in the placing of ill considered measures on the Statutes. Aside from uneasiness due to this cause, the proposed legislation is not of concern to many mining engineers.

BUSH.

You may suffer from the pack
Sack upon your blooming back
You may hit a trail where windfalls interfere
You may curse the murd'rous flies
That close up both your eyes
But as sure as fate you'll hustle back next year.

Be it river, be it lake,
Be it muskeg, watch it shake!
It's the bite that gets us grub upon a man
So it's no use saying "No!"
You have simply got to go
Quick in answer to the bush-call of your clan!

VNON

PERSONAL AND GENERAL.

There will be a meeting of the Toronto branch of the Association of the Women of the Mining Industry, at the Royal Ontario Museum on Wednesday, February 15th. Prof. W. A. Parks will give an illustrated talk on the geology of Toronto, after which Mrs. Parks will entertain at tea.

Mr. Norman C. Hosken has been elected president of Granby-Kirkland Gold Mines, Ltd.

The 125th meeting of the American Institute of Mining and Metallurgical Engineers will be held in New York, February 20-23.

Publishers' Announcement

The publishers of the Canadian Textile Journal take pleasure in announcing that they have been fortunate enough to secure the services of Mr. JOHN THOMAS HOYLE as director of extension courses for the training and education of apprentices in all the industries served by the journals issued from the Garden City Press, Gardenvale, Que. They feel that this is an important step in the history of their organization and in its development along the lines they have planned.

Mr. Hoyle, who will enter on his duties at Gardenvale on the 1st of next month, is a Canadian. He was born in Hamilton, Ont., and started his connection with the publishing business by serving as newscarrier and "devil" on the Hamilton Evening Times. He received his education at the Collegiate Institute, Hamilton, at McMaster University, Toronto; and at the University of Rochester, Rochester, N.Y.

Mr. John Thomas Hoyle

In all departments of the publishing business, whether editorial or mechanical, Mr. Hoyle has had a singularly ample and varied experience. At the present he is professor of Editorial Studies and head of the Department of Printing and Publishing at the College of Industries, Carnegie Institute of Technology, Pittsburgh, and is on the lecture staff of the Library School, Carnegie Library, Pittsburgh. Among the other positions which he has occupied may be mentioned those of Textbook writer and chief of the editorial department, International Correspondence Schools, Scranton, Pa.; Manager Textbook Department, International Correspondence Schools, New York City; Department Editor, "The Grit", Williamsport, Pa; Managing Editor, "The Fra Magazine" and "The Philistine", East Aurora, N.Y.; Vice-President of the Royerofters and literary advisor to Elbert Hubbard.

Among the works which Mr. Hoyle has edited are the following: "The Complete Writings (in fourteen volumes) of Elbert Hubbard; A Royeroft Anthology; In Memoriam; The Liberators; In the Spotlight; The Philosophy of Elbert Hubbard; The Four Minute Essays (in ten volumes) and The Crane Classics (in ten volumes) of Dr. Frank Crane; "Good Hardware", Aspinwall, Pa; and "The Winged Head", Pittsburgh.

Mr. Hoyle is the author of numerous articles in magazines and technical journals. He is also joint author of the Complete Advertising Course, International Correspondence Schools, and Standard Apprenticeship Courses, United Typothetae of America.

It will thus be seen that, in adding Mr. Hoyle to their organization, the publishers are adding one whose almost unique qualifications cannot fail to result in a great accretion of strength and efficiency to the entire organization in practically all its branches. His wide experience in the preparation of manuscript and in the artistic translation of manuscript into type will materially assist in the publishers' efforts to build up at Gardenvale a corps of copy producers, typesetters and pressmen second to none.

ANNUAL MEETING, C. I. M. & M.

For the Annual Meeting of the Canadian Institute of Mining and Metallurgy, to be held in Ottawa on March 1st, 2nd and 3rd, a well-chosen and select programme of papers has been prepared. It is at present subject to revision.

Wednesday, March 1st.

A.M.—Presidential address, by C. V. Corless.
Mineral statistics.

P.M.—The Economic Relations of Canadian Gold Production by Dr. Adam Shortt.
The Relationships of the Mining Industry to the Canadian Railway Problem, by Chas. Camsell.
The Mining and Milling of Gold Ores, by the Hollinger Staff.

Thursday, March 2nd.

A.M.—Institute Policies, by G. C. Mackenzie.
The Probabilities of a Stable Gold Production from Northern Manitoba, by J. P. Gordon.
Some Possibilities of Placer Mining in the Cariboo District, B.C., by W. A. Johnston.

P.M.—Recovery of Precious Metals from Sudbury Nickel Ores, by R. L. Peek.
Ontario Gold Deposits: Their Character, Distribution and Productiveness, by P. E. Hopkins.
Mining and Milling McIntyre-Porcupine Gold Ore, by the McIntyre staff.
Moving Picture Films Descriptive of Gold and Talc Mining in Ontario, by Ontario Government.

Friday, March 3rd.

A.M.—Ball Paths in Tube Mills, by H. E. T. Haultain and F. C. Dyer.
Drop Shaft Sinking, by A. A. MacKay.
Prospecting Conditions in Northern Manitoba, by R. C. Wallace.
Feldspar in the Ottawa District, by N. B. Davis.

P.M.—Excursion to plant of British American Nickel Corporation at Deschenes.

Evening.—Moving Picture Films Descriptive of the Asbestos Industry, by the John-Manville Asbestos Company.

Some Thoughts About Mining Engineers, Prospectors and Legislature

By JOSEPH T. MANDY.

Have you ever heard the wilderness howl? Most people of the great outdoors have. Perhaps, though they were not aware of it, they were being unconsciously impressed by this howling of the wilderness. The wilderness seems always to be howling. It howls with its impenetrable silence and it howls like ten million demons of wrath with its storm-swept mountains, forests and seas.

The influence of the wilderness, like that of music, is impressive on any individual. In those of even lethargic imagination, dormant emotions are stirred.

Unfettered nature can be soothing in its tranquility and terrifying in its unrelenting ferocity.

Always is the emotional influence of nature elevating to man. That is why the prospector, intimate with the swaying moods of Mother Nature, is generally lofty in his thoughts.

The unfettered, overwhelming freedom of the gigantic British Columbia Cordillera is always productive of constructive thought. Even though footsore and weary, staggering upward along a goat trail, panting under the load of a heavy pack, sweating blood in the conquest of some glacier-crowned peak, thoughts sometimes bitter, sometimes sweet, but generally lofty, course through ones brain.

It was under conditions such as these, during the traverse of Goat Mountain glacier, that Scotty, who was piloting me to his claim, let drop a remark which showed that he had been thinking. Seated on two blocks of blue ice, we had paused for breath at the jagged edge of a crevasse. As the woodsman accompanies his thinking with the careful whittling of a stick, so was Scotty lost in thought whilst his icepick worked overtime chipping futuristic designs on the ice. Suddenly he dug his pick viciously into the blue glacier, wiped the sweat from his furrowed forehead, and spat with great deliberation into the depths of the yawning crevasse. Then he spoke.

"Doc" he said! you're the first engineer I've been able to get up to my property. I've had others in tow; get 'em a little way, then they get a fit of the 'pessimistice' and reneg. 'Taint right! Call 'em mining engineers? I call 'em damned 'pessimism engineers'! 'Taint right!" Again he spat viciously into the blue depths of the crevasse. The engulfing possibilities of that crevasse as some gigantic spitoon seemed to fascinate Scotty.

"Scotty", I replied, "mining engineers who are chronic pessimists are not true to their profession."

"Doc, you sure spilled a mouthful. Let's go!"

A shower of tobacco juice shot into that gigantic icy hole.

Slowly we shouldered our packs and plodded wearily upward across the jagged surface of that grimly gaunt glacier. The slowly moving and bent figure of Scotty ahead of me symbolised deep thought. I think I know what was in his mind.

Scotty was right in his reference to pessimistic mining engineers. His remark bared to me a world of thought on relative mining subjects.

I have spent many months of examination work in the mountains of British Columbia, eating, sleeping, talking and thinking with the prospector. The pessimistic mining engineer seems to be a great grievance with him.

Why are so many field mining engineers pessimists? Why is this mental condition exotic to the profession, and what is the remedy for the condition?

With the hope that the sequence of thoughts as they occured and were discussed by Scotty and myself, sometimes on the trail, sometimes in camp, may be of some constructive value, I set them down now. Although they refer to British Columbia, this is perhaps only because they were born in the mountains of this province. They could be applied, I believe, to general conditions elsewhere.

Let us commence with the attitude of the examining engineer during the course of his work.

In general work the great majority of properties available for examination are of course raw prospects. The examination of a raw prospect should be productive of a deal of satisfaction to the mining engineer. The engineer is always nursing the hope that he may be instrumental in bringing a new mine to light. This is natural. In so doing he is returning good interest to his employers on the money invested in his services, fulfilling the motive of his profession, which is the production of something constructive and beneficial for humanity, as well as advancing his own personal prestige. Previous to the examination of every prospect, this should be the mental attitude of the engineer. If it is not, then he should not examine the property; he has omitted the first essential step of his work. This is a thorough preliminary investigation from every available source and material that will lead to the conclusion that the prospect has, or has not the earmarks of making a mine. If after this preliminary investigation the engineer concludes that the probabilities are against the property making a paying mine, then he is willfully wasting his time and that of his employers in conducting an examination. He will be deliberatly setting out to examine something that in his judgment he knows his employers are not looking for. This is not honest to his employers, himself, or the motive of his profession. If he has formed the reverse conclusion from this preliminary investigation then he cannot help but undertake the examination in the hopes that he will bring a new mine to light, for that has been the incentive to make the examination. If, perhaps, the engineer conducts an examination of a prospect without having previously made any preliminary investigation, what then is his mental attitude, and what prompts the examination? Surely not the hopes that he will bring a new mine to light for the hope that he will find a mine.

In the large majority of cases the results of his examination will lead to disappointment, but if he is true to his profession this should have absolutely no bearing on his honest, technical mental attitude.

There may be of course engineers who on account of many disappointments in examinations and "wild goose chases" have become cynics or skeptics. Some people who have been disappointed in love and life in general become bitter and cynical towards humanity and the world in general; they see nothing but evil, they think nothing but evil, they live in a mental atmosphere of destruction, not construction, and they exude this atmosphere. "Ex nihilo, nihil fit."

A mining engineer is after all only human. It is consequently quite possible for some disappointed examining engineers to become "mining cynics." These people are, however, neither true to themselves nor to their profession. Mining engineering is a highly constructive profession, probably the most constructive of all professions. A destructive or cynical mental attitude is consequently foreign to the motive of the mining engineering profession. A mining engineer, in order to be true to the impelling motive of his profession, must therefore necessarily be an optimist—meaning "a hopeful person." This does not mean an "ultra-optimist." Such a person is an extremely expensive and dangerous factor to the profession, and just as foreign to it as the cynic-sceptic-pessimist. A mining engineer must just simply be a well balanced optimist, "a hopeful person."

We see however that it is possible for a "mining pessimist-cynic" to result from the following of his profession. Why should this be, and what is the remedy? Plainly the cause is something lacking in the engineer's mental equipment; something missing from his education and training. The remedy is positively therefore the introduction into the curriculum of the mining engineer's training, of a subject, the absorption of which would eradicate or aid in the eradication of the exotic attitude. The trouble is very plainly a mental one, and the remedy nothing more than PSYCHOLOGY- the science of mental phenomena- "PSYCHOLOGY APPLIED TO MINING".

Everybody should study psychology. The mental equipment of every professional man is incomplete without a knowledge of Psychology applied to his profession. The mining profession is no exception. Now, some people are natural psychologists, but some are not. Some of those who are natural psychologists do not know how to apply their psychology. Some people who are not natural psychologists might wish to become, and undoubtedly do become, mining engineers. Let us hope that the training of the mining engineer will be made more complete by the introduction of "PSYCHOLOGY APPLIED TO MINING" as a compulsory subject in the curriculum of the student.

This leads us directly to related subject, namely the prospector and his relationship to the examining engineer, and through the examining engineer to capital and the mining industry in general.

The prospector's lack of necessary knowledge and opportunity for acquiring it is responsible for much—perhaps all of the cynicism produced in some examining engineers.

Much was said at a recent mining convention, and very justifiably, in eulogy of the prospector. Every thinking man must acknowledge the primary position the prospector occupies in the mining industry. Without the men who find the potential mines, there would naturally be no mines, no mining industry and no necessity for mining engineers. It is on account of this important position occupied by the prospector in the mining industry that he is deserving of every consideration, encouragement and aid, that will tend to increase his efficiency. He offers excellent material to work on. From the comparative standpoint of humanity the real prospector is a wonderful type of man. One has only to live with him, talk with him, sleep with him, eat with him, pack with him, smoke with him, share with him, in the intimacy of mountains, snows trails tent or cabin, to find this out. The life he leads' midst the uncontaminated purity of nature, surrounded by the results of the gigantic forces of nature, elevates character. His exterior is rugged and rough as his beloved mountain crags, but his spirit is sterling. His ideals are lofty as the mountain peaks. His morals and ethics are of a high standard. He is thoughtful, and constructive as well as analytical in his thinking. He is the personification of unselfishness. He is not avaricious and is by nature very modest in his ambitions regarding material things. His urge is not, as most people imagine, the acquisition of great wealth; nor is it fame. In reality the impulse is the fascination of his undertaking, his love for the surroundings and atmosphere with which his undertakings brings him into contact, and the peace of mind produced by these surroundings. Many a prospector has remarked to the writer, "Well, if I sell this property, I suppose I will have to go and find another." Robert W. Service puts this very aptly in one of his poems, when the prospector says, "Taint the gold that I'm wanting, so much as just finding the gold." Particularly endowed with these qualities is the British Columbia prospector of the Coast, Coast Range, and Interior Plateau with whom the writer has come in very intimate contact. Those of the Gold Ranges and Rocky Mountain Range, forming the Eastern ranges of the great Cordilleran system, are possibly of the same ilk. The province of British Columbia has a valuable asset in the standard of the real Cordilleran prospector. In the qualities of character of this real prospector there is the finest material to aid in developing the mining industry of the province. The fullest advantage should be taken of this.

Much is said and in newspaper conventions reports regarding what is being done for the prospector. It is shown that the department of mines aids in the building of trails. That the services of the District Engineers are available for advnce. This is fine, excellent, a very progressive step. It is also pointed out that a course of lectures by the District Engineers has been inaugurated. In these lectures the prospectors will be tanght Mineralogy, Geology, theories of ore deposition and principles of mining. This is also fine and excellent and a very progressive step. The prospector should be helped in the acquiring of this knowledge.

Besides Geology, Mineralogy and kindred subjects, the prospector should have some knowledge of the mine operator's or capitalist's business. He must be able to co-operate with the intending purchaser. This is mutually beneficial. The prospector, after he has made his discovery and partially opened up his prospect, is dependent on capital for further development, or eventual purchase of his property. It is highly important that he should have some understanding of what the operator is up against in undertaking to further investigate his property by means of development, with a view to purchase as a potential mine. To meet this end the prospector must know something about mining finance.

Knowledge of this sort will also assist the prospector in descriminating between a worthless prospect, and one of commercial importance. So many prospectors waste their time, money and energy on things that are glaringly commercially unimportant. The mineral occurence may be mineralogically and geologically interesting, but financially or commercially of no importance.

Now, something more that is in the writer's opinion extremely important. After the prospector has found something that he figures has ECONOMIC possibilities, he has to open it up, and put it in shape for exa-

mination by the engineer representing capital. The object of his work is to throw further light on the ECONOMIC possibilities of his prospect, not only for his own satisfaction, but also for that of the examining engineer. The more efficiently the prospector does this, the easier it is for the engineer to form a definite opinion. The more definite the opinion the less the speculative risk (this of course varies in proportion to the value of the opinion) not only to the capital of the intending purchaser, but to that of the prospector. In any event the chances for a "deal" are increased, or the prospector finds out that he has possibly erred in his judgement. A great fault with the British Columbia prospector in opening up his property is that he pays too much attention to underground work, at the expense of surface work. His capital is always far too limited to accomplish anything underground. The inducement sometimes is that he has a sheltered place to work in. Those who know the mountains and their rigorous climate can understand this attitude and sympathise with it. At the same time the great importance and value of surface work, the proving of surface continuity should be taught to the prospector.

It will be found that the prospector is an excellent pupil and thirting for knowledge.

Besides the aforementioned things, there are other considerations by which the prospector can and should be aided, and which, as they are at present, do not seem quite right. Take for instance his licence fee. This is a comparatively small item, but it is something, and the average prospector needs every cent he has. Why should a man who wishes to search the hills for something that will increase the prosperity of the country and everybody in it, have to pay for doing so? The work he is engaged in is absolutely constructive as far as the country is concerned. If his search is successful, the total benefit to the country and the people in it is far greater than that enjoyed by himself. True, he receives the protection afforded by the recording of his claim in a recording office, and other aids offered by the Department of Mines; but the results of his successful search are more than ample to offset the expense of these.

The recording fee is for like reasons equally unjust. Its abolition, and the working out of regulations to prevent unscrupulous and nonconstructive "blanketing" by pseudo-prospectors, is too lengthy a matter to deal with here.

Now a suggestion regarding financial aid to the prospector in opening up his claim. The British Columbia Legislature has already shown excellent progressiveness in providing through the "Mineral Survey and Development Act" for aid by means of diamond drilling and boring, on recommendation by the District Engineers. Frequently, however, a prospector has not sufficient funds to do the initial work necessary to open up his discovery efficiently as a preliminary to drilling. He lets it lie without doing any, or at most, very little work, and holds it by means of periodical re-staking. If it were more efficiently opened up it would possibly be in line for drilling, and consequently a step nearer a mine. The industry would be much further ahead if aid were offered for initial work, conditional on the recommendation of the District Engineers and repayment under the same conditions as those offered for drilling and boring.

Speaking of the inadequate recognition of the work of prospectors, one cannot help but think of their co-workers, the members of the Geological Surveys. The remuneration received by these people bears no relation whatever to the potential value of their efforts. The more adequate recognition of the importance and value of the Dominion and Provincial Surveys to the prosperity of the whole Dominion cannot be too highly and urgently recommended. As an aid to the prospector the work of these departments is apparent. It increases his efficiency as a prospector, and so brings him nearer to the capital he and the industry need. To the examining engineer the work of the surveys is a tremendous help, and so through the examining engineer tends towards the introduction of capital. To operators, the value of the work is infinite.

In British Columbia, at the present time, as in other provinces, besides the more general and broad work of the Survey, the work of the various members is concentrated on the detailing of areas broadly investigated by their predecessors. This detailing or localization work is extremely important and valuable. It saves a great deal of money and time for the prospector and the operator. The localization work of Miller Knight, Burrows and Hopkins in Northern Ontario has saved and been productive of millions for the Northern Ontario prospector, operator and capitalist. Definite areas, zones and geological conditions have been emphasized, the working out of which would have necessitated expensive, laborious, and time-robbing processes of elimination on the part of the prospector, operator and capitalist.

Many areas are observed in the field that never a prospector has trodden where localization conditions, particularly tectonic, are far more favourable for the deposition of commercial orebodies, than some in which the unknowing prospector is spending his time, money and energy. Many areas are seen in which the prospector is working, and in which he has practically no chance of success. His location may be petrographically right, but tectonically wrong. He may be only on the fringe or rim of a stress or pressure zone, in which he finds more or less superficial indications of commercial orebodies. He camps there, and works there, with no chance for success.

With the mapping of Localization Zones within the sphere of the Coast Range Batholith we will be able to concentring the constructive energy of those interested in the progess and development of the mining industry of British Columbia.

As a last suggestion, but perhaps the most important, "cut out" the exorbitant and destructive taxation of the industry.

T. & N. O. ELECTRIFICATION

The T. & N. O. Commission, as announced lately decided to go ahead and make a complete investigation into electrifying the road and the power that would be required, with particular reference to the extension from Cochrane to Oil Can Portage.

It is estimated that 500,000 horsepower can be developed on the Abitibi River at four or five separate points, between Kettle Falls, 16 miles north of Cochrane, and Oil Can Portage, or New Post, 70 miles north of the present end of steel.

The commission already has its eye on various waterfalls in the Ottawa, Montreal and Sturgeon River watersheds, from which power for the southern end of the line can be developed, but to mention the names of these places would considerably increase their value.

British Columbia Letter

Oil Flotation Used to Obtain Clean Coal and to Recover Coal From Material Heretofore Wasted.

A new washery plant is being installed by the Western Fuel Corporation of Canada, Nanaimo B. C., which is said to be unique in respect of colliery equipment on the American continent. Provision is made for incorporation of some principles found to be commercially practicable as a result of experiments in oil flotations that have been carried on for months. It may be said in passing that similar experiments have been undertaken both by the Canadian Collieries (D) Ltd., and the Granby Consolidated Mining Smelting & Power Co., the latter also being Vancouver Island Companies.

Mr. John Hunt, general manager of the Western Fuel Corporation of Canada, who has authorized the construction of the new washery, has two objects in his decision to use oil flotation. One is to produce clean coal and the other to use material that heretofore has been wasted.

On Vancouver Island, coal mines have been equipped with washery plants in which Robinson cone washers were used, and it has been customary to treat the residue from the washer by passing it through jigs and over concentrating tables in order to clean the smaller sizes. No serious effort has been made to concentrate the slack and sludge, which have gone to waste dumps or into the sea.

The coming summer should see the plant in operation, as construction already has started and the machinery has been purchased. P. E. Peterson, well-known as a pioneer in oil flotation concentration, is the designer and it is said that the plant is remarkable for its simplicity, requiring at the most two men per shift to supervise its operation. It will be an addition to the present washery, in which jigs have been discarded and four Deister coal concentrating tables substituted.

Refuse from the picking tables of the present washery and outside refuse are the materials to be treated. That from the dumps is delivered by paddle conveyor to a trommel screen. The oversize passes from the trommel by gravity down a launder to an eight foot Hardinge Ball Mill while the undersize passes by gravity into a screw classifier, the oversize from which passes by gravity to two Deister coal concentrating tables. These tables produce three products, viz.: coal, middlings, and rock. The undersize or overflow from the screw classifier is carried by gravity to a battery of six Peterson flotation cells; the product from two of these cells is clean coal and from the other four middlings. The coal from the flotation cells passes by gravity into a settling tank 30 feet in diameter from which the de-watered fine coal passes to a paddle conveyor by which it is carried to railroad cars for market.

The Middlings from the flotation cells pass by gravity along a launder to a bucket elevator near the Ball Mill into which the overflow water from the settling tank is also discharged. The bucket elevator discharges into a launder, along which the material passes by gravity to the trommel screen and is subjected to the same series of treatments as have been described. The coal and middlings concentrate made on the Deister tables are carried by gravity to a second screw classifier near the settling tank, while the fine de-watered coal is carried to the paddle conveyor, which delivers it into the railroad cars. The refuse from the picking tables is carried in cars to a bin from which it goes into a Blake crusher, which discharges into the Hardinge Ball Mill.

New Ventilating Plant at Comox.

The Canadian Colliers (D) Ltd., have a modern washery plant at Union Bay, Vancouver Island, where the product of their Comox Mines is assembled for water shipment from large bunkers and wharves. The equipment consists of Robinson cone coal washers and ten Maseo coal concentrating tables. During the past year the Company have been experimenting with oil flotation, some carloads of coal having been shipped to the Mineral Separation Company of San Francisco for testing, while a small experimental laboratory has been established at Union Bay.

General improvements effected recently include the enlargement of ventilating facilities at No. 4 Mine, Comox. In October of last year the installation of a second fan was commenced and with its completion Nos. 1 and 2 slopes of this Mine will be ventilated each by a separate unit. The present unit consists of a Sullivan double inlet fan, having a capacity of 180,000 cubic feet per minute, against a six inch water guage. The fan is electrically driven, a 350 H.P Induction Motor 2,200 volts, Speed 250 R. P. M. is directly connected to the fan shaft. This fan will in future ventilate the workings of No. 2 Slope, while the new installation will take care of the workings of No. 1 Slope. The new unit is situated west of the travelling way and in order to make room for the installation, extensive changes were made in the railroad yard, which not only increased the capacity, but added much to the efficiency and appearance of the whole plant. The new fan plant consists of a 108 inch double inlet reversible Sirocco fan on concrete base with half housing in steel. The fan will be connected to the mine by a reinforced concrete tunnel fully equipped with explosion doors. The fan will run at 250 R. P. M. and will deliver 200,000 cubic feet of air per minute against a six inch guage. The primary power unit will be a 500 H. P. synchronous motor, 2,200 volts, equipped with a self-starting unit. The motor will run at 500 R. P. M., connected to the main shaft of the fan through a Jack shaft with Silent Chain Drive in two sections each 15 inches wide, the ratio between the speeds of motor and fan being 2 to1 . The distance between centres of drives will be 106 inches. In addition to the premary drive there will be carried as an emergency unit a 350 H. P. Induction Motor, speed 250 R. P. M., which can be connected by a coupling directly to the main fan shaft. This induction moter is a duplicate of the motor now in use on the present ventilation units at No. 4 Mine and also at Nos. 5 and 6 Mines, and can in emergencies be used on any one of the three units.

The power unit will be housed in a fireproof concrete building with asbestos roofing, making one of the most complete and efficient plants in the province.

Considerable exploratory work in the form of diamond drilling has been done by the Company in the Table and Cumberland fields of the Island. In 1921, 6,991.6 feet of drilling giving a two inch core was completed. In 1919 and 1920 there were 15,051 feet drilled in the same area. To permit the transport of drills and supplies, 115,220 feet of roads were build

in the year last mentioned while in 1921 12,900 feet of road work was performed. In the Cumberland District, 3,370 feet of drilling was done and 12,300 feet of road constructed. There was a total, therefore, in the Comox Field during 1921 of 25,200 feet of road work and 10,361 feet of drilling performed by this Company. No official reports are available as to the results. In some respects they are satisfactory, according to common report. It was stated recently in the Press that six and seven-foot seams of high-grade coal had been cut in the vicinity of Cumberland.

The same Company has been carrying out systematic prospecting by means of the drill in the Extension and South Wellington fields, Nanaimo Mining Division. Work on Wellington coal seam has been under way on Haslam Flat, Oyster District, three bore holes having been put down, two 1500 feet deep and a third 900 feet. Good coal of workable thickness has been determined. About 300 feet of drilling has been done near the Nanaimo River in the Cranberry District.

An outstanding feature in connection with practically

on the line of the Company's railway from Extension to Ladysmith.

No Explosives at Cassidy Mine.

The Department of Mines, Victoria B. C., recently prohibited the use of explosives in the Cassidy Mine of the Granby Consolidated Mining & Smelting Co., the reason given being that it constituted a menace to the miners. The order followed reports of blowouts of methane and coal dust, a number of these occurrences taking place at intervals over a period of some months. In the opinion of the men affected, the prohibition is unduly severe, and objection is taken chiefly because it makes the work of the miner harder and, for those working on contract, less remunerative. Hon. Wm. Sloan, Minister of mines, has promised to consider the matter and in the meantime has forwarded a sample of coal from the mine in question to the U. S. Bureau of Mines, Washington D. C., in order that tests may be made to ascertain the explosive range of the coal dust.

Northern Ontario Letter

THE GOLD MINES.

every producing gold mine in Northern Ontario is that the managements are looking forward to further additions to the milling plants. In the case of the Hollinger Consolidated the plans and the specifications for adding over fifty per cent to the capacity of the plant are even now being prepared and this company is expected to be in a position to treat upwards of 6,000 tons and possibly 7,000 tons daily some time during the coming year. At the McIntyre also the work of increasing the size of the mill is actually progressing and before the close of the first half of the current year this company is expected to be treating between 700 and 800 tons of ore daily as compared with around 550 tons daily during recent years. This general desire to increase tonnage has also spread to the Dome Mines, where arrangements are being made to add from 20 to 25 per cent. to the capacity of the mill for treating the higher grade ore now being taken out.

Dome Mines.

By the time this letter gets into print, the daily papers of the country will be carrying a somewhat sensational story about results obtaining at the Dome Mines. It has been learned that mill heads have recently far exceeded the average at any other gold mine in the Porcupine field and have been a close second to even the bonanza Lake Shore at Kirkland Lake. Production for a single day has reached as high as $16,000. In connection with the remarkable achievement the Wall Street Journal carries the following news item:

"Dome Mines Co., Ltd., produced approximately $15,000 a day during January. The ore, as mined, averages at present $17.78 a ton in gold, and the recovery is $15,861. On January 26, wages were reduced 50 cents a day at both the mine and the mill.

"Although February is a short month, it is believed that gross earnings will be greater than for January, when the figures were the highest in the history of the company.

"At present rate of production, earnings are at the rate of between $4.50 and $5 a share on the 176,667 shares outstanding."

Concerning the foregoing statement in the Wall Street Journal, it is obvious that the paper is in error. For instance, if production did amount to $15,000 daily, it is a fact that tonnage has been about 1,000 tons daily and the recovery has exceeded $15 per ton. Another known fact is that costs are between $4 and $5 per ton, in the light of which the daily output of $15,000 would represent a profit of at least $10,000. Indeed, basing the analysis on this story of the Wall Street Journal, and estimating costs at one-third of the total yield, the net profit was $310,000 for January, or at the rate of $3,720,000 a year. This net profit would equal 78 p.c. annuity on the $4,766,670 of issued capital. Such an achievement is probably beyond anything that may be accomplished as yet, but the most conservative mining men in the business are expecting the Dome Mines to show net profits of from 35 to 40 p.c. annually from this date forward and with a further increase possible should the mill be again added to.

Claim Dismissed.

The dismissal of the action of the Hollinger Consolidated against the Northern Canada Power Company was announced on the 10th and is expected to signalize the commencement of work in connection with developing Sturgeon Falls on the Mattagami River. This will assure unrestricted operations at full blast at all the gold mines of the Porcupine district.

Gold Reef.

It is reported on the street that certain English interests may become involved in the Gold Reef property. This company was re-organized a couple of years or so ago in order to provide an extra million shares of stock with which to finance operations. Due to high wages and so on, nothing was done, but it would appear as though a plan of operation may now be mapped out. There are some spectacular showings of gold on the Gold Reef.

Paymaster.

A. S. Fuller of the Paymaster property, situated about one mile southwest from the Dome Mines, told the Journal correspondent that the work of continuing the shaft to a depth of 500 feet will commence this week.

Dr. Walter Harvey Wood, who visited the property recently recommended the expenditure of $100,000 on exploration and development work.

A plan is under way to re open the old Scottish-Ontario property, toward which end some English capital has been secured.

Ontario-Kirkland.

The first gold bar on the Ontario-Kirkland was poured during the past week and thereby places this promising property among the regular gold producers. The size of this first clean up has not yet been announced.

At a depth of 150 feet a new strike has just been made. The vein is about six feet in width and carries good milling values. The downward continuation of this ore body has been under development for some time at the 300 and 450 feet levels, a feature of the latest development being that it provides a third level from which to draw ore for the mill.

Bidgood.

Values at a depth of 400 feet on the Bidgood Gold Mines continue to improve and already a substantial amount of ore of good grade is in sight. At the time of writing, the gold values have increased about 25 p.c. in the drift as compared with assays at the point where the vein was first cut at this level.

Hunton-Kirkland.

Another important deal has been made in the Kirkland Lake district involving the Hunton Kirkland Gold Mines as well as two claims known as the Gibson-Duncan on the west and the Slaght-Solomon fraction on the east. The merger of these properties has already received the sanction of directors and only awaits final authorization by the stockholders of the Hunton-Kirkland.

It has been learned officially that a new company, probably known as the Hunton Consolidated Gold Mines will be incorporated to take over the entire group and will have an authorized capital of $3,000,000 made up of 3,000,000 shares of the par value of $1. each This will be allotted as follows:—1,000,000 shares to the Hunton-Kirkland. 410,000 shares to the Gibson-Duncan and 90,000 shares for the Slaght-Solomon.

This will give the new company a property approximately one mile in length from east to west, the direction in which the zone of mineralization courses through the claim. The stock remaining in the treasury, with the exception of 250,000 shares will be under option to the new company at prices ranging from 10 to 50 cents and will provide a total of $350,000 if all taken up. The 250,000 held in reserve will be available to raise money if needed for the erection of a mill in due course.

It is learned that the Minaker-Kirkland was also expected to join in the merger, but that delays due to the absence of two directors has prevented this company coming in for the time being. In the meantime, it is stated that the Minaker will still be given a chance to enter the consolidation in consideration of 500,000 shares in the new company.

The foregoing proposition carries an assurance from the holders of the option on the stock of the new company that a minimum of at least $1,500 will be spent monthly on the property. William Green has been active in negotiating the deal.

Reorganize Light Railway Co.

Cyrus D. Pinelle, liquidator, has issued notice that a meeting of the creditors of the Canadian Light Railway Construction Company, Ltd., will be held in Toronto on February 22nd.

"A meeting of the shareholders of the company recently held was of the opinion that the company was not properly organized, and unanimously passed a resolution that the company should go into voluntary liquidation for the purpose of re-organization; and at the same meeting approved of the company entering into an agreement for the sale of its undertaking to a new company known as the Canadian Light Railway Construction Company, Ltd., as a going concern, to be paid for by the allottment of a share of the new company's stock for each issued share of the capital stock of the old company and in consideration of the new company assuming the old company's liabilities." (The "old company" referred to was known as the Northern Light Railways.)

The statement continues further: "The new company has a capitalization three times as large as the old company; less than one-fifth of its capital stock will be required to replace the shares held by the shareholders of the old company, and the remaining shares will remain in the treasury of the company for the protection of the creditors and shareholders.

"The shareholders of the old company trust that its creditors will realize that the shareholders have materially altered their position in favor of the creditors, and desire that the creditors release the old company and accept the covenant of the new company to pay the creditors of the old company, so as to enable the re-organization to be consummated.

"It is important", continues the statement, "that as liquidator of the old company I should know at once if the creditors are willing to do this, and that I should know at an early date the amount of the creditors remaining unsatisfied, so that the new company will be able to provide for payment thereof."

THE SILVER MINES.

Beaver Consolidated.

Reports are current that something may be done to re-open the Beaver Consolidated Mine within the next sixty days or so. Frank L. Culver, president of the company, visited the camp recently and this strengthened the opinion that a new start may be made. It is known on good authority that the physical condition of the Beaver mine is quite good and that the prospects of mining a big tonnage of good low grade ore are excellent.

South Lorrain.

Perhaps the most outstanding feature in connection with the silver mining industry of this district is the renewal of interest in the South Lorrain district. The records in the office of the mining recorder are being searched in detail and any mining claims not in good standing are being re-staked.

During the past week the Mining Corporation of Canada took out some exceedingly rich ore from the Haileybury Frontier property, which it holds under working option. One specimen weighed upwards of eighty pounds and is said to have contained several thousand ounces of silver to the ton, having the appearance of a huge silver nugget.

Victory Silver.

The new vein on the Victory property, situated in

south-west Coleman, which was reported last week in the Journal, has maintained an average of from two to six inches in width and continues to carry high silver values.

Silver Bullion Co.

The annual meeting of the Silver Bullion Company, holding property in the Leroy Lake section of the Cowganda silver area, will be held some time during the current month at which time the question of resuming operations will be considered.

Nipissing.

The Nipissing has made no announcement as yet with respect to its intention about the Rochester property in the Porcupine district, although the general result of exploration work by diamond drilling is such as to indicate the likelihood of the Nipissing taking over the property.

Working forces at the silver mines of Cobalt now number between 600 and 700 men, or approximately the same number as are engaged in the Kirkland Lake district.

KIRKLAND LAKE.

(Special Correspondence.)

This Ontario gold mining camp now ranks next in importance to Porcupine. The centre of the camp, on the south shore of Kirkland Lake in Teck camp, is reached by a motor stage drive over a first rate road from Swastika on the T. & N. O. Ry. This road is good in summer and better in winter. This astonishing fact is due to the unusual enterprise of the people of Teck township (which includes both Swastika and Kirkland Lake) and to the skill and energy of Walter Little, who undertakes to keep the road open for motor car traffic all winter. This he does with a wonderful snow-plough drawn by from three span to seven or even nine span of horses. After that plough has passed, the road is like a paved street and a fairly wide one at that! The Kirkland Lake Hotel, just opened, offers the traveller clean, well heated rooms, and even the luxury of a hot bath. The village, growing fast, must accommodate itself to the demands of about 600 miners, and a large number of prospectors, some of whom can be seen every day passing, pack on back, for it has been found possible to continue prospecting, but particularly development work, through the winter months.

The camp is rather remarkable for the number of small surface showings which under good management and courageous investment have led to producing mines. Attention was first given in some cases to small, very rich, ore-bodies which were soon worked out, and, if the methods pursued in so many Ontario gold camps of the past had been followed, this field would have been abandoned. But, as in the case of the Tough Oakes (but without its dormant period), successful search has been made for large ore bodies of more modest gold content, and the result has been some five or six mines either producing or with production assured, and everything so far points to the continuance of the ore bodies in depth. It is a rather common experience in this camp to find somewhat insignificant outcrops of ore expanding into large ore bodies as sinking progresses. Gauthier, the second township east of Teck, has yielded promising results to the persistent prospector. A discovery was made late last fall by three prospectors, Perry, Tobicoe and Fetterly (Miss Mabel Fetterly). As is quite commonly the case in this district, the values were found in a mineralised zone which includes stringers of quartz with altered rock, the latter predominating. In the opinion of a competent mining engineer who has seen this discovery, it is of considerable importance.

It is noticeable in this district that many prospectors carry on development work throughout the winter. The ore bodies in many cases outcrop in low-lying ground, where test pits are more easily sunk in winter when water is not so bothersome.

While it may be confidently stated that the operations in those mines located on the main break running through Kirkland Lake have proved the presence of good-sized ore-bodies with paying values, judgment must be reserved as to the future of outlying properties. But on the whole there is ground for the hope that a considerable number of mines will be added to those already on the producing list.

SOUTH AFRICAN CHROMITE.

In the current Bulletin of the Imperial Institute, the chromite deposits of Rhodesia are briefly described. As Rhodesia is Canada's chief competitor in the production of this mineral, we reproduce this description.

"H. B. Maufe describes the result of a further investigation of the chromite deposits in the Umvukwe Hills. The ore is in seams, generally less than a foot thick, in the central portion of the Great Dyke, and its occurrence has been compared with that of a series of coal seams lying one above the other in a basin.

"The country rock is usually enstatile partly serpentinised, but in some cases the floor of the seam is enstatite and the roof serpentine, which appears to be derived either from a dunite or a saxonite. The synclinal structure of the dyke at this point is similar to that in other parts of the dyke described by P. A. Wagner and others. The method of depositions of chromite in the Great Dyke differs widely from that of the well-known Selukwe deposits, or indeed from any other known deposits of the mineral, and the deposit is of later geological age. The Great Dyke chromite can be hand picked to yield a product containing 50 per cent. of chromic oxide, and the quantity available probably amounts to some millions of tons."

INDUSTRIAL NOTES.

Ingersoll-Rand have issued bulletin 10102, describing their Price Rathburn oil engine. This is built in sizes from 105 to 1,000 B.H.P. Features are, smokeless exhaust, due to complete combustion of the fuel, high fuel efficiency; ignition by its own heat of compression, and rugged and single construction.

This new prime mover might prove specially suitable for mines or mills, where fuel is expensive, and where hydro-electric power is not available; or it might prove to be an economical "stand by" to guarantee electric plants against shut down in case of failure or reduction of power supply.

Hardinge Company, in catalogue No 12, describe in a general way the use of pulverised fuel, and in particular their Quigley Fuel Systems. The latter includes a flexible system of crusher dryer, pulveriser, air conveyor, storage bin and burners.

The use of pulverised fuel is of particular interest in Canada, where low grade fuels are the rule rather than the exception. The development of apparatus such as described in this bulletin in will help materially to solve our fuel problem. Of particular interest in this connection is a reference to the possibility of using economically both lignite and peat.

OLIVER FILTERS FOR THE HOLLINGER.

The Journal is reliably informed that C. E. Rodgers of Cobalt, representing the Oliver Continuous Filter Company of New York and San Francisco, last week closed a Contract with the Hollinger Consolidated Gold Mines Limited for six more 14' x 16, Oscillating Type, Oliver Filters, together with complete vacuum and solution pump equipment and all accessories.

One Oliver Filter of the same size and type was installed at the end of the Dorr Counter Current section of the Mill some months ago. This filter has been operating continuously with highly satisfactory results, having decreased the soluble loss in both gold and cyanide to a practically complete recovery. The one machine, together with the additional filters just ordered, all seven of which will be placed at the lower end of the present cyanide plant and take the underflow from the Dorr tanks (what has normally been the final tailing), will have a capacity of at least 4,000 tons of dry slime per day. The total filtering area will be about 5,000 square feet.

The exact price of the entire filtering equipment is not stated but is understood to amount to about $70,000. This sum may at first appear to be a large capital expenditure; however, when it is realized that it takes an additional recovery of even less than 5 cents per ton for one year, on 4,000 tons per day, to save $70,000, it resolves itself into merely a very profitable investment.

The residue from the filters will contain about 20 p.c. moisture and it is planned to discharge this comparatively dry cake to conveyor belts which will deliver to the final tailing disposal system.

HEMATITE IN SOUTH AFRICA.

In the transactions of the Geological Society, South Africa, (1921), are described the hematite deposits of the Rustenberg District, Transvaal. These were formerly to be sedimentary beds, representing exceptionally rich portions of banded ironstones. Now it appears that they owe their origin to a process of secondary enrichment, whereby the original layers of certain sections of the banded ironstones have been replaced by iron oxide, giving rise to solid bodies of ore made up of alternations of primary and secondary hematite layers. In this respect they are of identical origin with some Lake Superior hematite deposits.

The Rustenberg deposits overly dolomite, and are overlaid by a bed of chest-conglomerate. Many million tons probably average not less than 40 per cent. of iron, but the high silica content destroys their value as potential ores of iron. However, lenticular and irregular tabular bodies of high-grade ore occur, associated with ironstone, from a few inches up to 51 ft. in thickness, and from a few yards up to 1,000 yards in length. The two main horizons containing the hematite deposits occur near the contact in the chest-conglomerate, and also near the contact with the dolonite, and the lower portion of the former has in one place been replaced by hematite, giving rise to small irregular deposit of that ore. Analysis show the ore to be of high grade, containing from 60 to 67.75 per cent. of iron, from 0.55 to 6.32 per cent. of silica, from 0.006 to 0.05 per cent. of phosphorus, and no sulphur.

GOLD MINING REVIVAL IN NOVA SCOTIA.

Halifax — According to reports received by the Provincial Department of Lands and Mines, there will be considerable revival of gold mining in Nova Scotia this year. Many prospectors have taken out licenses, and old companies have been enlarging their plants.

Gold mining has been carried on in this province for over a century, but the production has not been large, the greatest annual output being valued at $589,000. Between 1862 and 1920 the production was 967,457 ounces, which at a valuation of $19 per ounce was worth $18,229,683. The annual production has ranged between 20,000 and 30,000 ounces.

Nova Scotia gold is derived entirely from vein workings. The auriferous quartz bearing veins occur in groups, running parallel to one another in a system of anticlinal domes. The Atlantic shore from Canso to Yarmouth is occupied by the auriferous strata. The width of this district varies from ten to forty miles and the area in which gold occurs is estimated at 3,000 square miles.

MINING QUOTATIONS.

Quotations on Active Stocks on Standard Stock Exchange, Toronto, for week ending Feb. 14th, 1922.

	High	Low	Last
Silver.			
Adanac Silver Mines, Ltd.	1⅛	⅞	1
Bailey	3	2½	2¾
Beaver Consolidated	21	19	19
Coniagas	1.30	1.30	1.30
Crown Reserve	14¾	12½	14¾
Gifford	½	⅜	½
Hargraves	⅜	⅜	⅜
La Rose	40	37	38½
McKin.-Dar.-Savage	18½	17	18½
Mining Corp. of Can.	1.05	1.03	1.05
Nipissing	6.50	6.10	6.30
Ophir	2⅝	1	2½
Peterson Lake	5	5	5
Temiskaming	33	31½	32
Trethewey	6	3	3
GOLD.			
Apex	2⅛	1⅝	1⅞
Atlas	12	10	12
Dome Lake	6	6	6
Dome Mines	24.25	23.90	24.25
Gold Reef	2⅜	2	2⅜
Hattie Gold M. Ltd.	20	20	20
Hollinger Cons.	8.57	8.16	8.50
Hunton Kirkl'd G. M.	10	7½	7¾
Keora	10	9	9¾
Kirkland Lake	32	29½	31
Lake Shore M. Ltd.	1.50	1.37	1.43
McIntyre	2.56	2.42	2.54
Moneta	12	10	11½
Newray Mines, Ltd.	10½	7½	9½
Porcupine Crown	18	14	17
Porcupine Imperial	½	¼	¼
Porcupine V.N.T.	23	20	23
Preston East Dome	6	3	5
Schumacher	36	33	35
Skeora	27	25½	25½
Teck-Hughes	31	28½	29½
Thompson Krist	2	2	2
West Dome	7	6½	7
West Tree Mines Ltd.	3½	3½	3½
Wasapika Gold M. Ltd.	3	2½	3
MISCELLANEOUS.			
Petrol Oil	17	15	15
Rockwood Oil, Gas	¾	½	¾

The Canadian Miners' Buying Directory.

Acetylene Gas:
Canada Carbide Company, Ltd
Prest-O-Lite Co. of Canada, Ltd.

Acetylene Welding:
The Toronto Iron Works, Ltd.

A.C. Units:
Powley & Townsley, Limited.

Agitators:
The Dorr Co.
Can. Chicago Bridge & Iron Co., Ltd.
Horton Steel Works, Limited.

Air Compressors:
Belliss & Morcom, Ltd.
Laurie & Lamb
Sullivan Machinery.

Air Hoists:
Canadian Ingersoll-Rand Co., Ltd
Mussens, Limited.

Air Receivers:
The Toronto Iron Works, Ltd.

Alloy and Carbon Tool Steel:
Peacock Brothers Limited.

Alternators:
MacGovern & Co.

Aluminium:
Spielman Agencies, Itegd.

Amalgamators:
Northern Canada Supply Co.
Mine and Smelter Supply Co.
Wabi Iron Works.

Antimony:
Canada Metal Co.

Antimonial Lead:
Pennsylvania Smelting Co

Assayers' and Chemists' Supplies:
Dominion Engineering & Inspection Co.
Lymans, Limited
Mine & Smelter Supply Co.
Pennsylvania Smelting Co.
Stanley, W. F. & Co., Ltd.

Ash Conveyors:
Canadian Link-Belt Company

Ashes Handling Machinery:
Canadian Link-Belt Co., Ltd

Assayers and Chemists:
Milton L. Hersey Co., Ltd
Campbell & Deyell
Ledoux & Co.
Thos. Heys & Son
C. L. Constant Co.

Asbestos:
Everitt & Co.

Balls:
Hull Iron & Steel Foundries, Ltd.
Peacock Brothers Limited.
The Wabi Iron Works.
The Hardinge Conical Mill Co
The William Kennedy & Sons, Ltd.

Ball Mills:
Hardinge Conical Mill Co
Hull Iron & Steel Foundries, Ltd.
Mine & Smelter Supply.
The Wabi Iron Works.

Babbit Metals:
Canada Metal Co.
Hoyt Metal Co.

Ball Mill Feeders:
Hardinge Conical Mill Co
Hull Iron & Steel Foundries, Ltd
Mine & Smelter Supply.

Ball Mill Linings:
Hardinge Conical Mill Co
The William Kennedy & Sons, Ltd
Peacock Brothers, Limited
Hull Iron & Steel Foundries, Ltd
Mine & Smelter Supply.

Balances — Assay & Analytical:
Mine & Smelter Supply.
The William Kennedy & Sons, Ltd

Belting—Leather, Rubber and Cotton:
Canadian Link-Belt Co., Ltd.
Northern Canada Supply Co
Jones & Glasco.

Belting:
R. T. Gilman & Co
Gutta Percha & Rubber, Ltd

Belting—Silent Chain:
Canadian Link-Belt Co., Ltd
Hans Renold of Canada, Limited, Montreal.
Jones & Glassco (Regd.)

Belting (Transmission):
Goodyear Tire & Rubber Co

Belting (Elevator):
Goodyear Tire & Rubber Co

Belting (Conveyor):
Goodyear Tire & Rubber Co
Gutta Percha & Rubber, Ltd

Bins and Hoppers:
The Toronto Iron Works, Ltd.
Can. Chicago Bridge & Iron Co., Ltd.
Horton Steel Works, Limited.

Blasting Batteries and Supplies:
Canadian Ingersoll-Rand Co., Ltd
Mussens, Ltd.
Canadian Explosives, Ltd.
Powley & Townsley, Limited.

Bluestone:
The Consolidated Mining & Smelting Co
The Conlagas Reduction Co., Ltd.

Blowers:
Canadian Fairbanks-Morse Co., Ltd
Northern Canada Supply Co.

Boilers:
Canadian Ingersoll-Rand Co., Ltd
Marsh Engineering Works
R. T. Gilman & Co.
The John Inglis Company
Wabi Iron Works.
The William Kennedy & Sons, Ltd.

Blue Vitriol (Conlagas Reg'd):
Canadian Fairbanks-Morse Co., Ltd

Bortz and Carbone:
Diamond Drill Carbon Co.

Boxes, Cable Junction:
Standard Underground Cable Co. of Canada, Ltd
Northern Electric Co., Ltd.

Brazilian Rough Diamonds:
Diamond Drill Carbon Co.

Brazilian Mica:
Diamond Drill Carbon Co.

Buggies, Mine Car (Steel)
Hendrick Manufacturing Co

Brazilian Ballas:
Diamond Drill Carbon Co

Brazilian Rock Crystal:
Diamond Drill Carbon Co

Brazilian Tourmalines:
Diamond Drill Carbon Co

Brazilian Aquamarines:
Diamond Drill Carbon Co.

Bridges—Man Trolley and Rope Operated—Material Handling
Canadian Mead-Morrison Co., Limited

Bronze, Manganese, Perforated and Plain:
Hendrick Manufacturing Co.

Buckets:
Canadian Ingersoll-Rand Co., Ltd
R. T. Gilman & Co.
Hendrick Manufacturing Co.
Canadian Link-Belt Co., Ltd
Marsh Engineering Works
Mussens, Ltd.
MacKinnon Steel Co., Ltd
Northern Canada Supply Co.
The Wabi Iron Works
The William Kennedy & Sons, Ltd

Buckets, Elevator:
Canadian Link-Belt Co., Ltd
Hendrick Mfg. Co.
Peacock Brothers Limited
The William Kennedy & Sons, Ltd

Cable—Aerial and Underground:
Canada Wire & Cable Co.
Northern Canada Supply Co
Standard Underground Cable Co. of Canada Ltd
Peacock Brothers, Limited

Cableways:
Canadian Mead-Morrison Co., Limited
Fraser & Chalmers of Canada, Ltd
Mussens, Ltd.
The Wabi Iron Works
R. T. Gilman & Co

Cages:
Canadian Ingersoll-Rand Co. Ltd. Montreal, Que.
Northern Canada Supply Co
Fraser & Chalmers of Canada, Ltd
The Mine & Smelter Supply Co
Mussens, Ltd.
The Wabi Iron Works
The William Kennedy & Sons, Ltd

Mica In the British Empire

The Imperial Mineral Resources Bureau have added lately to their list of bulletins a clear and concise review of the mica industry of the British Empire. We in Canada are apt to take for granted our position as one of the world's chief producers; and it were well for us to bear the fact in mind, and to take pains to preserve by whatever means are possible, our present prominent place in the industry. Below is reproduced a part of this report

General.

Owing to the irregular mode of occurrence of mica, systematic mining operations are rarely possible. For the most part the mineral is mined or quarried by open-cast methods and the excavation abandoned when the visible supply is exhausted. Where true mining operations are possible, the work is carried out by hand drilling, just sufficient explosive being used to loosen the rock preparatory to removing the mica crystal by picking. The product is sorted and split into plates and roughly thumb-trimmed and graded on the mine, after which it is sent to works where the plates are further trimmed, graded, and split.

Clear sheet mica commands a high price for stove and furnace doors, for gas-lamp chimneys and shades, and other purposes. The chief use of sheet mica, however, is for electrical purposes as an insulator. During the war it was used for gas masks.

Sheet mica is used largely as follows:—

(1) For separating the commutator segments of dynamo-electric machinery. A soft mica is best for this purpose, as this ensures equal wearing of the copper segments and the mica separators. Consequently phlogopite or a soft muscovite is in greatest demand for this purpose.

(2) For electrical heaters and cookers, and for pyrometers.

(3) Electrical condensers.

(4) Sparking plugs and magnetos.

(5) Washers, and insulation of bolts and screws generally.

For all the above, as indeed for most other purposes, it is necessary that the mica should split easily. It should also be free from cracks and conducting inclusions. Sheet mica less than 2 by 4 inches is practically useless for the purposes specified.

Discs and washers punched from mica sheets are also used in arc lamps and gramophones, and smaller ones in the sockets of incandescent lamps. Flexible mica-covered cloth and tape find various uses in electrical apparatus.

Formerly only sheet mica measuring 2 by 4 inches and upwards could be readily marketed, and much material of smaller dimensions was sent to the waste dump. At the present time, owing to the method of building up mica sheets from thin plates of scrap mica suitably trimmed and cemented with shellac, the greater demand in the industry is for splittings less than 2 by 4 inches in size, which can be hydraulically compressed and cemented with shellac into sheets of any desired thickness or size, or moulded to various shapes. Such material, known as "micanite", has now largely replaced sheet mica in commutators, especially those of large machines.

An important use of micanite is for the insulation of the conductors in high-tension alternators when sheet mica cannot be used. The micanite is made in large thin sheets and is wound round the conductor by means of special machinery, the insulation being completed by heating under pressure. Alternatively, tubes are made in a similar manner, and the conductors afterwards inserted.

Micanite is largely used for marine switchboard insulators. The use of micanite is rapidly extending in the electrical industry; and consequently the chief demand is for mica splittings, which are imported in large quantities from India and Canada.

Ground mica pulverized from mica scrap is used for a variety of purposes, the principal of which is to impart a lustre to wall-paper. Only the finer grades passing 160 to 200 mesh screens are suitable for this purpose. Other uses for fine-ground mica are as a component of paints and as a lubricant.

World's Production.

At the outset of the period under review the chief mica-producing countries were the United States, India, and Canada; comparatively small quantities were obtained from German East Africa (now Tanganyika Territory), Brazil, Argentina, and Madagascar.

Throughout the war period numerous factors contributed to increased activity in the mica-mining industry, and many new producers came into the market. Germany was formely a large consumer of high-grade sheet mica suitable for electrical purposes, and the closing of this market had a depressing effect upon the mica-mining industry generally. As the war proceeded large quantities of mica were required for munition purposes, and both the Allies and the United States obtained increasing quantities of sheet mica from Argentina and Brazil. The enemy powers, being shut off from the regular sources of supply, turned to Norway and Sweden for their requirements. In the latter country a considerable industry sprang up in the manufacture of electric insulating material from mica mined in the Bohuslan district, and it is expected that this industry will be permanently established in Göteborg.

Before the war the exploitation of mica in Argentina was chiefly in German hands. Output was desultory and the industry could not be considered permanent. The high prices ruling throughout the war period for sheet-mica of good quality stimulated production, and in the latter years of the period important shipments of such mica were made to England, the United States, Italy, and Spain.

Large sheets of mica are recorded from Finland, but difficulties of transport have militated against mining operations in that country.

British Empire.

The greater part of the high-grade sheet mica consumed in industry is obtained from countries within the British Empire. India produces most of the high-grade sheet muscovite consumed, while Canada possesses almost a monopoly of the phlogopite variety. In addition to these producing countries, South Africa, Brazil, and Australia have considerable resources of high-class mica. So great is the producing capacity of India, that little effort appears to have been made to utilize scrap mica, which is at present thrown on the dumps, and an enormous tonnage of this material is now available for the manufacture of mica-board (micanite) and ground mica. In view of the great importance attained by the micanite manufacturing industry in the United States, and the large quantities of valuable sheet mica now being produced in many South American countries, the value of the Indian scrap mica for grinding and mica-board manufacture should not be overlooked.

(To be continued.)

Canadian Miners' Buying Directory.—(Continued)

Cables—Wire:
Standard Underground Cable Co of Canada, Ltd.
Canada Wire & Cable Co.
R. T. Gilman & Co.

Cable Railway Systems:
Canada Wire & Cable Co.

Cam Shafts:
Hull Iron & Steel Foundries, Ltd.
Peacock Brothers Limited
The William Kennedy & Sons, Ltd.

Car Dumps:
Sullivan Machinery Co.
R. T Gilman & Co.

Carbide of Calcium:
Canada Carbide Company, Ltd.

Cars:
John J. Gartshore
MacKinnon Steel Co., Ltd.
Northern Canada Supply Co.
Marsh Engineering Works
Peacock Brothers, Limited
Mussens, Limited
Powley & Townsley, Limited.
R. T. Gilman & Co.
The William Kennedy & Sons, Ltd.

Car Wheels and Axles:
Canadian Car Foundry Co., Ltd.
Burnett & Crampion
Hull Iron & Steel Foundries, Ltd
John J. Gartshore
Marsh Engineering Works, Ltd.
Peacock Brothers Limited.
The William Kennedy & Sons, Ltd.

Carriers (Gravity):
Jones & Glassco

Castings—Brass
The Canada Metal Co., Ltd.

Castings (Iron and Steel)
Hull Iron & Steel Foundries, Ltd
Peacock Brothers Limited.
The William Kennedy & Sons, Ltd.

Cement Machinery:
Hadfields, Limited
Hull Iron & Steel Foundries, Ltd.
Burnett & Cramptor.
The William Kennedy & Sons, Ltd.

Chains:
Jones & Glassco
Northern Canada Supply Co.
Canadian Fairbanks-Morse Co., Ltd.
Canadian Link-Belt Co., Ltd.
Greening, B., Wire Co., Ltd.

Chain Drives:
Jones & Glassco (Regd.)

Chain Drives—Silent and Steel Roller:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal, Q.
Jones & Glassco) Regd.).

Chemical Apparatus:
Powley & Townsley, Limited.

Chemists:
Canadian Laboratories
Campbell & Deyell
Thos. Heyes & Sons
Milton Hersey Co.
Ledoux & Co.
Constant, C. L. Company

Chrome Ore:
The Electric Steel & Metals Co.
Everett & Co.

Classifiers:
Mussens, Limited
Fraser & Chalmers of Canada, Ltd
The Wabi Iron Works
R. T. Gilman & Co.
The Dorr Company

Clutches:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal, Q.

Coal:
Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutters:
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd
Peacock Brothers, Limited

Coal Crushers:
Canadian Mead-Morrison Co., Limited
Canadian Link-Belt Co., Ltd.
Peacock Brothers Limited.

Coal Mining Explosives:
Canadian Explosives, Ltd
Giant Powder Company of Canada, Ltd

Coal Mining Machinery:
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd
Canadian Ingersoll-Rand Co., Ltd.
Sullivan Machinery Co.
Marsh Engineering Works
Hadfields, Ltd.
Hendrick Mfg. Co.
Powley & Townsley, Limited.
Mussens, Limited

Coal and Coke Handling Machinery
Canadian Link-Belt Co., Ltd.
Powley & Townsley, Limited.

Coal Pick Machines:
Sullivan Machinery Co.

Coal Screening Plants:
Canadian Link-Belt Co., Ltd.

Cobalt Oxide:
Coniagas Reduction Co.
Everit' & Co.

Compressors—Air:
Smart-Turner Machine Co.
Canadian Ingersoll-Rand Co., Ltd.
Mussens, Limited
Peacock Brothers, Limited

Concrete Mixers:
Gould, Shapley & Muir Co., Ltd.
MacGovern & Co., Ino
Mussens, Limited

Condensers:
Smart-Turner Machine Co.
Northern Canada Supply Co.
Belliss & Morcom, Ltd.
Laurie & Lamb
Peacock Brothers, Limited

Concentrating Tables:.
The Mine & Smelter Supply Co.
Deister Concentrator Co.

Converters:
Northern Canada Supply Co.
MacGovern & Co., Inc.

Conveyors—McCaelin Gravity Bucket:
Canadian Mead-Morrison Co., Limited.

Contractors' Supplies:
Canadian Fairbanks-Morse Co., Ltd.

Consulters and Engineers:
Hersey Milton Co., Ltd.

Conveyors:
Canadian Link-Belt Co., Ltd.
Jones & Glassco (Regd.)
Powley & Townsley, Limited.

Conveyor Belts:
Gutta Percha & Rubber, Ltd.

Conveyor Flights:
Canadian Link-Belt Co., Ltd.
Hendrick Mfg. Co., Ltd.

Conveyor—Trough—Belt:
Canadian Link-Belt Co., Ltd.
Hendrick Mfg. Co.
Mussens, Limited
Jones & Glassco (Roller, Belt and Chain)
Hendrick Mfg. Co.

Conical Mills:
Hardinge Conical Mill Co.

Copper:
The Canada Metal Co., Ltd.
Consolidated Mining & Smelting Co.

Couplings:
Hans Renold of Canada, Limited, Montreal, Q.

Cranes:
Canadian Mead-Morrison Co., Limited
Canadian Link-Belt Company
Peacock Brothers, Limited
R. T. Gilman & Co.
Smart-Turner Machine Co.

Crane Ropes:
Allan Whyte & Co.
Canada Wire & Cable Co.
Greening, B., Wire Co., Ltd.
Peacock Brothers, Limited

Crucibles:
The Mine & Smelter Supply Co.

Crusher Balls:
Canada Foundries & Forgings, Ltd.
Hull Iron & Steel Foundries, Limited, Hull Que.
Osborn, Sam'l (Canada) Limited.
Peacock Brothers, Limited
Swedish Steel & Importing Co., Ltd
The William Kennedy & Sons, Ltd

Crushers:
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
Hardinge Conical Mill Co.
Lymans, Ltd.
Mussens, Limited
Osborn, Sam'l (Canada) Limited
The Electric Steel & Metals Co., Ltd.
R. T. Gilman & Co.

THE EMPLOYMENT SITUATION.

The Department of Labour, Ottawa, has just published its returns for January. The following items relate to the mining industry.

Iron and steel.—Very pronounced shrinkage occurred in this group. Statements were received from 632 firms with a total payroll of 75,699 workers as compared with 102,623 employees on December 17. There was therefore a decline of 26,924 workers or 26.2 per cent. This contraction comprised fully 50 per cent of that recorded for all industries during the fortnight under review. The larger share of the loss was due to temporary shutdowns in railway car shops over Christmas and the New Year, which affected employment in practically every province although the reductions were particularly heavy in Quebec, Ontario and the Prairie Provinces. Declines on a much smaller scale occurred in the manufacture of crude, rolled and forged products, general machinery, steel ships, heating appliances, shoe metal, boilers, engines, tanks, agricultural implements and iron pipe. These contractions affected very many more persons than those recorded in the corresponding fortnight in 1920, and employment for the period under review was approximately 34 points lower than at the end of December of the preceding year.

Mining.—Further contractions though on a more moderate scale were recorded in the employment afforded in the mining industries. Returns compiled from 192 operators showed that they employed 42,260 men as compared with 42,918 workers in the preceding fortnight. There was therefore, a decline of 658 persons or 1.5 per cent. Coal mining in Nova Scotia, metal mining in Ontario and British Columbia and stone quarrying in Quebec and Ontario afforded less employment. The contractions in the coal and metallic ore branches of the industry were less pronounced than those reported at the end of December, 1920, but in non-metallic minerals they were somewhat larger. The index number for the group as a whole, however, was about 3 points lower than during the same fortnight in the previous year.

WORKING DAY IN COAL MINES.

In 1903 the United States Geological Survey began the collection of statistics of the established working day in local mines. In that year 26.5 per cent of the bituminous mine workers were employed at mines where the standard day was 10 hours; 17.1 per cent were employed at 9-hour mines, and the number of 8-hour day workers was 56.4 per cent of the total. The average working day in that year was 8.7 hours.

These figures, it will be understood, are not the average number of hours that men labor, but the average hours in the standard working day.

No great changes in the working day occurred in bituminous mines up to 1917. The average for that year showed only 8.4 per cent. employed in 10-hour mines; 12.6 per cent. in 9-hour mines, and reduced the average working day to 8.3 hours. The 8-hour day was even more generally adopted in 1918, when 90.6 per cent. of the bituminous workers were employed in 8-hour mines. The statistics for 1919, indicate that 95.5 per cent. of the mine workers now labor in mines where the 8-hour day is the rule. The number of workers in 10-hour mines was 6,127.

The anthracite mines now work an 8-hour day. Prior to March 31, 1916, the standard anthracite day was 9 hours.

MORE GOLD FROM LILLOOET?

From Lillooet comes the report that old-timers there are showing renewed activity, and already the hills are beginning to resound with shots of dynamite as prospectors continue their eternal search. The fact that there is but little snow on the ground is the reason for the early start.

Writing of the Whitewater district in 1911, Dominion Geologist Bateman reported that the formation extended from Eldorado Creek to Chilco Lake and that the gold was traceable throughout this stretch in the contact between the Coast granites and the volcanic rock, practically every creek cutting this contact panning gold.

Charles Camsell, now Dominion deputy minister of mines, who visited the district in 1918 for the purpose of inspecting the Copper mountain findings on behalf of the Dominion government, corroborated the conclusions of Mr. Bateman.

Seated around the camp fire one night, in company with several prospectors, Mr. Camsell strongly recommended the latter to prospect north-west of Copper Mountain along the contact. From his examination of the country he stated that he had reached the conclusion that along this contact great gold finds would be made. It was largely owing to this advice that E. J. Taylor, who was one of the party, and who had for many years prospected the Bridge River and surrounding country, decided to concentrate his efforts upon the Whitewater, his decision resulting in the discovery of the "Windfall" and other claims.—Resources Monthly, Prince Rupert.

COPPER IN SHETLAND.

In Special Report No. 17, on the Mineral Resources of Great Britain (1921), there is described the occurrence of copper in Shetland.

There are two wide lodes, one of which has been proved to a depth of about 300 feet. Oxidised ores, including malachite, melaconite, limonite and hematite, occur to a depth of 100 feet (water level). Below this, the filling consists of pyrite and chalcopyrite, in stringers and nests, in a white gangue of carbonates of lime, magnesia and iron.

The mine was opened about the end of the eighteenth century; shafts were sunk, and £2,000 worth of copper ore was raised, after which the workings were abandoned. The mine was reopened in 1872, and it is estimated that in the following eight years 10,000 tons of iron and copper ore were raised. An inclined shaft was sunk on the vein to a depth of 180 ft., and most of the material above the 100-ft. level was removed, but large reserves of ore were left below that level. Nothing further was done until 1920, when active development started.

Both pumping and crushing machinery have been erected, as well as an electrolytic refining plant, but it is understood that operations at the mine and works ceased in October, 1921, no doubt largely owing to the low price of copper.

Let us remember, always, that Canada offers to the prospector the most inviting and accessible partly-known territory in the world.

It is an unrivalled country for all who feel the red blood of the pioneer, the prospector, the "blazer of trails" coursing in their veins.

EDITORIAL

PROSPECTING IN OLD ONTARIO.

Old Ontario has begun to vindicate itself as a metal producer. For many years the failures and fiascos of the early promoters and miners gave the province such a bad name that no one would believe it capable of substantial and consistent mineral production. The discovery and successful operation of deposits at Sudbury and Cobalt, and then Porcupine, gave New Ontario a place as a mineral producer; but still is was commonly held that Old Ontario's day was done — and a very short and stormy day it had been. Meantime, a steady, and increasing, production of mica and feldspar, mostly on the initiative of farmers and would be miners, wrung from the public and from the accredited members of the mining profession, the concession that Old Ontario was capable of the economic production of non-metallic minerals. The successful talc industry at Madoc and the operation of pyrites mines confirmed this impression.

Today we have a demonstration that Old Ontario's mineral production has entered a new phase. The Kingdon mine and smelter produced last year three million pounds of lead. This year the amount will be doubled, and that is not the end. It has been publicly stated, on the basis of geological examination, that there are in Eastern Ontario a number of veins similar in character and prospective value to the Kingdon vein. This argues well for the production of lead in Old Ontario.

There are mining men (few and far between, to be sure) that consider South Eastern Ontario well worth serious attention as a possible source of metals. It is excellently served by railways, natural water-routes and canals, and most of it is well served by highways and lesser roads. It is settled sufficiently to provide food, shelter and labour in almost any quarter. Except for small, isolated areas, it has not been prospected since the early days of settlement, and then only in the cursory way common to the time. At present there is little prospecting being done except by local residents, whose knowledge of methods, minerals and rocks is ordinarily so fragmentary as to make their efforts of little avail. The trained prospectors of the north will not come down to a district where the mineral right is held already by farmers and by the speculators of old time. Consequently this district, at one time, and still, of such promise as a mineral producer, continues to be dormant for lack of the prospecting and initial development that must precede all productive mining.

We have a practical (and possibly practicable) suggestion. The majority of the consulting mining engineers of Eastern Canada live in or near the area under discussion. Some of these are fully occupied, others have time for additional professional work. All claim title to proficiency in at least one part of mining, and most of them have specialised in examination of prospects. Our suggestion is that, when time and circumstances permit, these members of our profession should hunt up, examine and develop promising prospects on their own initiative. There are plenty to be had awaiting such attention. In Old Ontario there are few busy at such work, and the reward of these few has been, on the average, above that of similar pioneers in New Ontario.

At times rebuke and even abuse is heaped upon the heads of trained mining engineers by those who deal more directly with Mother Nature. Perhaps it is thus the case when the 'bush whacker' speaks of the consulting mining engineer. Often he must bring the results of his toil for the consideration of a white-collared, prosperous-looking individual in an armchair behind a polished desk, and there accept a decision based on — he knows not what. This is irritating, to say the least. If our consulting engineers were to make

a practice of sharing, as far as possible, in the labours of the men on whom they depend for a living, it would be better for prospector and practitioner, and the public as well.

MINING INVESTMENTS.

The "Northern Miner" on Feb. 18th asks whether Toronto is in danger of losing its control of the mining development of Northern Ontario and replies in the affirmative. According to the "Miner" there is in Toronto an adverse influence at work that is responsible for unfriendly legislation and lack of sympathy with the mining industry of the North. The "Miner" sees evidence of this in the frequent attacks on mining enterprises in some papers and in the legislation under consideration in Queen's Park. The "Miner" is evidently of the opinion that the attitude of the Drury government is hostile to the development of Northern Ontario, and that Toronto is losing its influence in the North and will lose its market for goods also, as the business will naturally be diverted to the more friendly centres that supply the money needed for developing the new country.

While much evidence can be found in support of such views, we have little doubt that Toronto will not easily be deprived of its business relations with Northern Ontario. The attitude of the Drury government is not necessarily the attitude of the people of Toronto.

The "Miner" refers to recent sales of Hollinger shares to Montreal buyers and of McIntyre shares to New York buyers. Such transactions, if very large, would make notable alterations on the list of shareholders, but would not affect operations much unless control passed into new hands. The buying of such shares does not put any money into the treasuries of the companies. It is notable that this is the type of investment that is commonly highly commended. Everybody knows that these mines are not in need of money for development, that they are being operated profitably and paying dividends and that they will likely continue to do so for some time. Under the circumstances financial editors who know little about mines can safely advise purchase of the shares. To sing the praises of these mines now is but to join the big chorus. Twelve years ago when money was needed to develop the properties and the owners could not yet demonstrate that the ore would be profitably mined, there was no chorus and many critics. It is the investments that make mines that are of interest to the North. The trading in shares is of comparatively little consequence.

The control of mining enterprises commonly remains in the hands of those in control when profitable production begins. Until that stage is reached the necessity for raising money may bring many changes; but, when operations are yielding a profit the changes are relatively few. Consequently the position of Toronto or any other centre with regard to control of northern mining enterprises will depend largely on those who make mines rather than on those who invest in shares after the mine is made.

To what extent the people engaged in mining enterprises are affected by adverse criticism from those that advise against the initial investment we cannot say. Unfair criticism has doubtless done harm, but we doubt whether it results from a studied effort to discredit mining enterprises. There are always risks to be run in the development of mineral deposits, and those that wish to keep their money until there are no risks will never help to develop mines. Those that cater to such investors magnify the known risks and introduce much unfounded adverse comment that is evidently designed to hold the reader to the view that an enterprise in need of money is dangerous and not to be engaged in honorably. The fact that those that provide the money to make mines are much more useful citizens than those that buy shares in the made mines is seldom given prominence. Luckily there are a few who realize that the making of a new mine is something worth while.

There are chances of profit in both types of investment; and advocates of either type that rest assured of criticism from those that favour the other.

SCIENTIFIC RESEARCH.

The Advisory Research Council at Ottawa has just issued a brochure of twenty pages entitled "Research and the Problems of Unemployment, Business Depression and National Finance in Canada." The title suggests something compendious; but the twenty pages are brief and to the point, as befits a dissertation on scientific facts, intended for wide-spread and popular distribution. We wish to outline here the history of the movement of which this bulletin forms a part.

Three years ago there was first presented in public by the advisory Research Council a proposal for the establishment of a National Research Institute at Ottawa. This met with a storm of opposition. Universities feared their prerogatives (and funds) might be curtailed. Students of public administration foresaw a further waste of public resources in yet another government department. Misanthropes saw our once-vigorous researchers waxing fat on soft government jobs, with initiative gone and progress long forgotten. Honest fears wereadded to vague feelings of distrust and (it was whispered) even personal envy and private spite, to bring the project into a disrepute that was widespread among the technical and general public.

The gentlemen who had formulated the idea refused to be intimidated, or even gravely concerned by the coldness with which their proposal was received. They had studied long and hard before reaching their conclusion, and were prepared to stick by it. They probably realized at this time that their seed had been sowed on ground they had failed to till suffieiently; still they were ready to prepare the ground further

and sow again, before despairing of a crop. Incidentally it may be remarked that few among our men of science realize how formidable and intricate a task is public propaganda, until enlightened by some such experience as this.

Fortunately, the innate persistence of the researcher is shared by the members of our Advisory Research Council. They have set out to educate the public to the need of research on a national scale and for national objects, and to convince it of the soundness of the scheme they have proposed. Most of, if not all, our universities are now satisfied that the National Research Institute will not duplicate their work; nor will it undertake research that should more properly be conducted within college walls. Our manufacturers now understand more clearly the service the Institute will be able to render them. It has been pointed out, too, that the researcher seems to have a kind of auto-inoculation against the energy-destroying diseases that usually attack government employees. The progress of this propaganda is well marked by the support given by the Commons in Ottawa during the last session, to the bill to create a Research Institute. Possibly it is fortunate that the Senate threw out the bill. It seems as if our House of Commons had, for once, preceded the public in its support of a progressive measure; now the public may have time to catch up.

It says much for the soundness of judgment and forbearance of the Advisory Research Council that they have refused to use the $100,000.00 voted them last autumn in the face of the ill-timed and short-sighted economy of the Senate's veto. As an expression of the Commons' faith in the judgment of their scientist advisers, this was acceptable; but as the means of erecting and equipping a Research Institute, it was hardly adequate. The vote might easily have been considered an earnest of more to come, and it would have been quite permissible to proceed with the establishment of the Institute on this basis. Wiser and more far-sighted counsel prevailed, and the education of the public proceeds apace, by means of public addresses, press notices, and now the present pamphlet.

The discussion and controversy of the past three years have no doubt modified somewhat the original ideas of the sponsors of the National Research Institute. This is salutary, and indeed necessary. We hope that the present legislature will see to it that a new bill is presented and passed, to found and maintain what has now been satisfactorily demonstrated to be a national economy and a national necessity.

EDITORIAL NOTES

Cheaper Oil from Shale.

In a recent editorial we called attention, in a purely speculative way, to the possibility of producing oil from shale without removing it from its native bed, this idea being based upon the successful recovery of sulphur by the Frarch method in Louisiana and Texas. Now comes news from Tasmania of actual trials of such a method, re-printed on another page. The commercial development of such a method will mean much to Canada.

Banking of Coal in Cape Breton.

A contributor to the Bulletin of the C. I. M. & M. says of the wage question, which is now seriously affecting the coal industry in Nova Scotia, that he would be inclined to take a chance, strive after a compromise for a twenty five per cent reduction instead of thirty-five and then give orders to work all collieries full time. Then with a million tons of coal on bank he would be ready to supply the extra demand sure to follow in the event of a strike in the bituminous mines of the United States.

This solution of the present problem is one that might have good results for both employers and employees. It is a solution of course that places the risk on the employers; but they have to take such risks at all times. The surest thing about coal mining is that the operators will pay the wages that they agree to pay.

That the production of coal in Nova Scotia should be maintained at capacity is much to be desired. Provided the operators believe they have a reasonable chance of making a profit on operations they will doubtless endeavor to produce large quantities. Faced by poor markets and high costs they are unwilling to take chances. If the costs were reduced to a considerable extent there would be some incentive to mine coal now, and take chances on future markets; but to mine coal at high cost this year is not an attractive enterprise.

Wright Hargreaves.

The report on operations at the Wright Hargreaves mine for 1921 will be pleasing to shareholders. The mill was put in operation on May 1st and by the end of the year there had been produced $468,665 in bullion from the treatment of 36,081 tons of ore. On January 2nd $137,500 was paid to shareholders.

The Wright Hargreaves is apparently nicely started on a long and profitable career. The property is an excellent one and those who have brought it to the producing stage will be well repaid for their enterprise.

OBITUARY.

HON. G. R. SMITH.

The Hon. George R. Smith died at Thetford Mines, Quebec, on Monday, Feb. 20th. Mr. Smith was for years an outstanding figure in the Canadian Mining Institute. As one of the Institute's founders, he fought its battles frankly and played no small part in preserving its existence during very tronblous times. His connection with the asbestos industry will be more fully touched upon in a later number of the Canadian Mining Journal.

The late Mr. Smith was always a man of keen and discerning public spirit. For 12 years he sat in the Quebec Legislative Assembly for Megantic, and in the year 1911 he was appointed a member of the Legislative Council. His death will be deeply mourned by scores who had learned to respect and love him.

W. A. BOSTWICK.

The sudden death of W. A. Bostwick, President of the International Nickel Company leaves a vacancy in the affections of his friends and deprives the mineral industries of Canada and the United States of one of their most unobtrusive and capable chiefs.

Not many knew "W. A. B.", so unassuming was he in all things excepting where business and personal rectitude exacted his assertion of what was right. A trained scientist in steel and its metallurgy, a master mathematician, he was another of "Carnegie's young men", who have left their indelible imprint upon the records of industrial achievements in the past thirty years. Loyal as an adjutant to the late Ambrose Monell, familiar with the economics of the Nickel industry, undeviating from his sense of duty to his company and Canada, Arthur Bostwick, as his familiars knew him, had executive abilities of the highest pre vision.

"Now It Can Be Told", as Philip Gibb's entitled one of his books", might have included a chapter on what Mr. Bostwick and his colleague, Mr. Monell, did toward winning the Great War. That work, and what has ensued, no doubt drained the vitality of the President of the International Nickel Company. Self-centered in his work, a diplomat, with a large discretion, it devolved upon him to navigate the tronbled waters during those stormy days when nickel as a metal was vitally essential to the Allies—and it was as vital that the enemy should have no supplies of it.

A silent sentinel keeping vigil, playing an open hand with the representatives of the allied nations, having every transaction of record and making it clear to authorized officials—"Now It Can Be Told" that it was Arthur Bostwick who personally went to an upper floor of the Equitable Building and charged with treachery the man who diverted a small quantity of nickel so that the Deutschland could sneak it away by the undersea route.

The recreant confessed his guilt. It was the solitary slip in the arrangements for the perfect control of the sale of nickel. Mr. Bostwick made in impossible for the conspirators to spirit away the nickel that had been taken from one warehouse to another—eventually getting to Brooklyn. The United States not having declared war, all that could be done was to notify the Canadian and Imperial authorities as to what had happened. The Secret Service saw to it that the nickel remained in the Brooklyn warehouse.

Mr. Bostwick appreciated the gravity of the matter—and it was not until the Deutschland reached the United States that all his precautions proved unavailing.

In this, as in all else, Mr. Bostwick never thought or acted obliquely. The millions expended by the International Nickel Company—to a great extent under the direct supervision of Mr. Bostwick—display his optimism, and the fruition from Copper Cliff, Spanish River and Port Colborne plants will be ample when the times are ripe. What Mr. Bostwick performed as a patriotic executive and prescient economist, inevitably leaves it to his associates and intimates to understand what a vacancy has been created by his death.—Alexander Gray.

PERSONAL AND GENERAL.

Members of the Association of Women of the Mining Industry were entertained last Wednesday at the Royal Ontario Museum by Prof. W. A. Parks and Mrs. Parks. Many friends of members were present and a most delightful afternoon was spent. The Library committee reported that they had shipped 142 books to the Kirkland Lake public school as the beginning of a library that the members of the Association have undertaken to furnish for that school.

E. J. Donohue has resigned the position of general manager of the Britannia Mining & Smelting Company after having been with the Company for about nine years. Having entered the service of this Company in the early years of its enterprise on Howe Sound, B. C., he has been closely identified with its development and expansion to one of the largest copper producers of the Empire. His duties at first were the supervision of financial and business affairs but subsequently he succeeded J. W. D. Moodie as general manager. Mr. Donohue has been subjected in the course of a few months to the strain of two disasters at Britannia Beach, one the destruction of the Company's Mill by fire and the other the wiping out of the mining community by flood with considerable loss of life. He feels that his health demands a prolonged rest and so has asked to be relieved of the responsibilities of his office. Mr. Donohue is highly respected and very popular in British Columbia and his many friends regret his determination to leave.

D. M. Drumheller Jr., formerly manager of the Tidewater Copper Company, has returned to Sidney Inlet. He will supervise the re-opening of the company's Indian Chief Mine and plant. Considerable development, including the construction of a concentraing mill and a tramway, had been completed when the slump in copper occured and a close-down was forced. A shipment of 400 tons to the Tacoma Smelter was the last of any size from this property. It is expected that the mine will be producing again within a month. Mr. Drumheller has been in private practice in Spokane for a year.

W. Haseltyne, a well-known American metallurgist, has been placed in charge of the concentrating and cyanide plants at the Premier Mine, Portland Canal.

The Wages of Colliery Workers in Nova Scotia

The following is an authoritative statement, in brief, of the events to date leading up to and following the recent "Gillen award" in the Sydney coal fields. It will serve as an authentic record of the facts of the case, as well as a source of information for those who have not followed the matter closely in the daily press. — Ed.

During the year 1921 the wages paid to the mineworkers in the Nova Scotia coalfield were governed by an agreement arrived at in November 1920 between the employees and the several managements of the coal companies now merged into the British Empire Steel Corporation, namely the Dominion Coal Company, Nova Scotia Steel & Coal Company and Acadia Coal Company. This agreement was arrived at because of a mutual refusal of the men and the coal companies to accept the recommendations of a Royal Commission which enquired into the wages and working conditions at the coal mines in the Summer of 1920. At the beginning of 1920, under the guidance of a Conciliation Board headed by Mr. Clarence Mackinnon, a wage agreement had been come to which covered the year 1920. About the time when commodity prices reached the peak in June 1920 the mineworkers applied for a further increases in wages. Their action resulted in the appointment of the Royal Commission and the eventual disagreement above referred to, and in November 1920, an agreement was made which gave the mineworkers an increase of 55 cents per day, with equivalent tonnage increase to contract workers. This agreement, since known as the Montreal Agreement, expired at the end of November 1921. Under its terms the parties thereto agreed to meet in November to negotiate a new wage understanding, but by mutual consent negotiations were deferred until the middle of December. The coal companies gave notice that business conditions compelled them to ask a reduction in wages upon the expiry of the Montreal Agreement, and the mineworkers took the ground that no reduction could be accepted. At the deferred negotiations in December the mineworkers consistently maintained refusal to accept any reduction, no matter how slight, and, for this reason, the negotiations were entirely futile. The coal companies thereupon announced a reduction in wages effective at 1st January 1922, of approximately 33 percent. from the rates current in 1921. The wording of the notices announced a reduction of 25 percent. from the rates of the Mackinnon Award, the reduction being applied in this way in order to preserve the rate differentials which were a feature of the Mackinnon Award, having been arrived at by protracted negotiations with the mineworkers.

The United Mine Workers, upon receiving the notification of reduction, immediately applied for a Board of Conciliation, which was appointed by the Minister of Labor, without the concurrence of the coal companies. The mineworkers secured a temporary injunction restraining the companies from putting a reduction into effect pending a reference to a Conciliation Board, contending that the action of the companies was a violation of Clause 57 of the Industrial Disputes Act. An appeal to the full bench of judges in Halifax resulted in suspension of the injunction, on the ground that both parties having consented to meet to negotiate a new understanding, and having failed to do so, no violation of the Industrial Disputes Act could be argued. One of the judges, in a separate judgment, expressed his grave doubt of the constitutionality of the Industrial Disputes Act insofar as it undertook to regulate private business in the Provinces, but as the injunction was suspended on separate and sufficient grounds, the constitutional point was not raised in the main judgment.

A Conciliation Board, under the chairmanship of U. E. Gillen, General Manager of the Toronto Terminals Railway, was held in Halifax, the proceedings occupying almost a fortnight, and attracting widespread public attention.

The report of the Board recommended a modification of the reduction announced by the coal companies, making the reduction of the laborers' rate 25 percent. and in the other rates of approximately 28 1-2 percent. below the wage rates of 1921.

The mineworkers have voted on an unqualified question put by their leeaders as to whether or not they should accept the award of the Board, and practically unanimous vote against acceptance was given.

The coal companies have notified the mineworkers of their willingness to negotiate an agreement with the Award as a basis, if acceptance by the men were signified by the 15th February. It is understood that, in the event of non-acceptance, now assured by the vote mentioned, the companies will put the Award into effect.

TASMANIAN SHALE OIL EXPERIMENT.

"The Industrial Australian and Mining Standard" states that Mr. John Fell's experiment of firing the mountain side in "panel" section for the extraction of oil, in contrast to the usual method of retorting, is still attracting attention from experts in the oil industry. It is worth recalling that a report on the proposed project was prepared by Mr. R. H. Cambage, the State Under-Secretary for Mines, as far back as August, 1917. Mr. Cambage then said: "Mr Fell's proposal to fire the shale mines at Wolgan, and thereby use it as a retort for the extraction of the oil, is a unique one, but within certain limits it is recommended that such proposal may receive departmental sanction. The two important questions which present themselves are those of success and danger. The success or otherwise of the venture is for Mr. Fell to consider; that of the danger, by the fire getting out of hand and destroying the shale as a whole of the locality, also the possibility of an explosion near the mouths of the tunnels, and the consequent loss of life in the vicinity, is for departmental consideration. I understand that the shale outcrop in this vicinity is not of any great extent, and is covered, in most cases, with from 50 to 100 ft. of loose earth on the talus slope of the hill, so that the chances of an internal fire reaching the workings are very much minimised. I would suggest, however, that, for the present, the permission to fire the mine be restricted and the result of operations on this area be awaited before further permission is granted. I understand from Mr. Fell that this particular area is the one he proposes to first operate upon."

Pat Daly, veteran prospector and [illegible] Stewart B. C., has left for New York with a view [illegible] is understood, to interesting capital in [illegible] properties of the Salmon Arm [illegible] Portland Canal District.

Kingdon Mine and Smelter

Ontario has a full fledged lead mine and smelter. This will be news to all but the select few who have followed the quiet and consistent progress of the Kingdon Mining, Smelting and Manufacturing Co., Ltd., since 1914.

Forty five years ago a calcite vein carrying galena was located on Chats Island, where the Mississippi river divides to flow into the Ottawa. Little was done to develop this outcrop until it came to the notice of Mr John E. Hardman, consulting engineer and Mr. A. G. Munich of the James Robertson Company, eight years ago. The steady and logical development that has been conducted since then is a credit to the pertinacity and sound judgment of those in charge.

Fig. I.— Headframe Under Construction.

The galena that provides the reason for the plant now erected, occurs with calcite in one of the regional fault-planes common in this part of Ontario. It has been described by Uglow in the Ontario Bureau of Mines report, Vol. 25 (1916), and by Wilson in the Summary Report, 1918, of the Geological Survey and a memoir now in the press. The country rock is crystalline limestone of the Grenville series, cut by occasional dykes of granite and intrusive masses of diorite. Very little zinc or other impurities are in the vein, so mining, milling, smelting and refining have all been favoured by Nature.

Within the last few months, extensive alterations and additions have been made to the hoisting and milling equipment, and now all is in process of being "tuned up" for steady production. The hoisting and crushing equipment has more than sufficient capacity to supply the mill, which is designed to handle 250 tons a day of ore. The mill building, by the way, gives evidence of its recent growing-pains, by its lumpy and patchy exterior. One can be justly suspicious of a mill building that looks as if it had been made-to-order—it is more likely than not to represent pre-conceived ideas on the part of the mill-man that usually spell ruin for the undertaking. The smelter, on the other hand is a neat unit adopted ready-made from the East St. Louis Smelting Works. It will treat 22 tons a day of concrete, and will produce 18 tons a day of refined lead.

The Mine.

The vein has been developed to date by a shaft 426 ft. deep, with levels at 85 ft., 200 ft., 300 ft. and 400 ft. Above the 200 ft. level, all ore has been stoped. The main ore reserves at present are between the 300 and 400 ft. levels. The 400 ft. level has been developed by drifts on the vein (in a northwest and southeast direction) 1350 ft. in length. A winze, now at a depth of 519 ft., will be sunk to 550 feet, and from that level, a raise made to the main shaft. In this winze the vein is 6 ft. in width, of first-class ore. The vein varies in width from 4 ft. to 16 ft., with an average of about 5½ ft.

Shaft to Mill.

The shaft has three compartments, each 4' x 4', for cage, skip, and ladder and pipes, respectively. The head-frame, 65 ft. high, was built by the Dominion Bridge Co., and houses a Ross grizzley, primary crusher and bin. The machinery is all electrically-driven, power being had from a falls on the Mississippi river at Galetta, a mile away. A small Flory hoist handles the six-man cage, and a larger Marsh (Belleville) hoist, the skip. A Canadian Ingersoll-Rand high-speed, two-stage compressor, of ten drill capacity furnishes power underground.

A feature of the ore-handling equipment outlined in the above flow-sheet is the Ross drop-bar grizzly feeder and screen. It is a rugged piece of machinery, and as its name implies, gradually feeds the skip-load of ore to the crusher and acts a screen for undersize. It is operated intermittently, at the will of the crusherman, by a small motor, and makes the feeding of the crusher steady and safe. A special description of this will be given next week.

All feeder and conveyor belts are the endless Dunlop "Samson" variety, and belt idlers are from the Elmira Machinery and Transmission Co. It is refreshing to find such a large proportion of Canadian-made machinery at a Canadian mine.

Mill.

The present mill is the result of experiment and trial extending over several years, under the guidance of Mr. Hardman, consulting engineer for the company. The flow-sheet is simple, as benefits an ore that is not

Fig. II.—Headframe, and Conveyor to Mill.

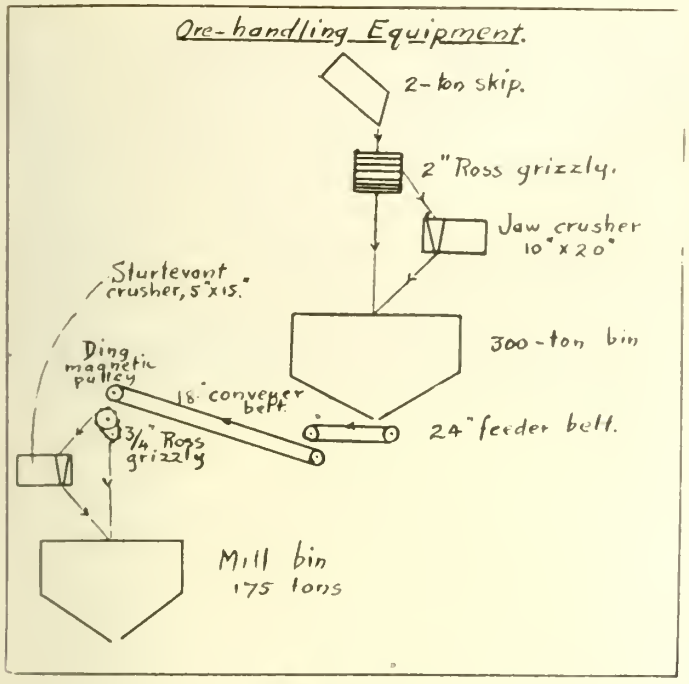


Fig. III

complex, and it is flexible, to allow of whatever adjustments may prove to be in the interests of economy. The apparatus used is, in general, of the compact type characteristic of modern metallurgical machinery. The flow-sheet is self-explanatory; but some of the items need detailed description.

A mill bin, of ample capacity, is connected by a combined feeder and weighing belt to a bucket elevator, which goes from bottom to top of the mill. This elevator also hoists re-crushed material from the rolls and the Hardinge mill, mentioned later. The ore, two inches in size and under, is fed, with water, to a ½" Mitchell Vibrating Screen. The oversize goes to rolls set at ½ inch and back to the bucket elevator. The undersize falls directly on a second vibrating screen of 3/16" mesh, whence the undersize goes to a third screen of 3/32" mesh, and the oversize to a second pair of rools set at 3/16 inch, and thence to the bucket elevator. The undersize from the third screen goes to a Richards classifier and James sand and slime tables, and the oversize to a James Automatic Jig. The jig is a multiple unit, giving from the first gate a clean lead concentrate, from the second, a lead middling, and from the third and fourth, a lead-zinc middling, the three middling products going to a small Hardinge ball mill, and thence to the bucket elevator for return to the main circuit. This jig is a comparatively recent development, and is an ingenious combination of the principles underlying both the old Hancock jig and the newer Richards pulsator jig. Like the latter, its tonnage capacity is quite out of keeping with its small size.

To return to the James tables, all sand goes first to No. 1 table, which gives a lead concentrate and a middling product. The latter is thickened in a Callow cone and then divided into sand and slime in a Richards classifier. The sand goes to Nos. 2 and 3 tables, and the slime joins that from the former Richards classifier to pass over the James slime tables, Nos. 4 and 5. Tables Nos. 2, 3, 4 and 5 each give a clean lead concen-

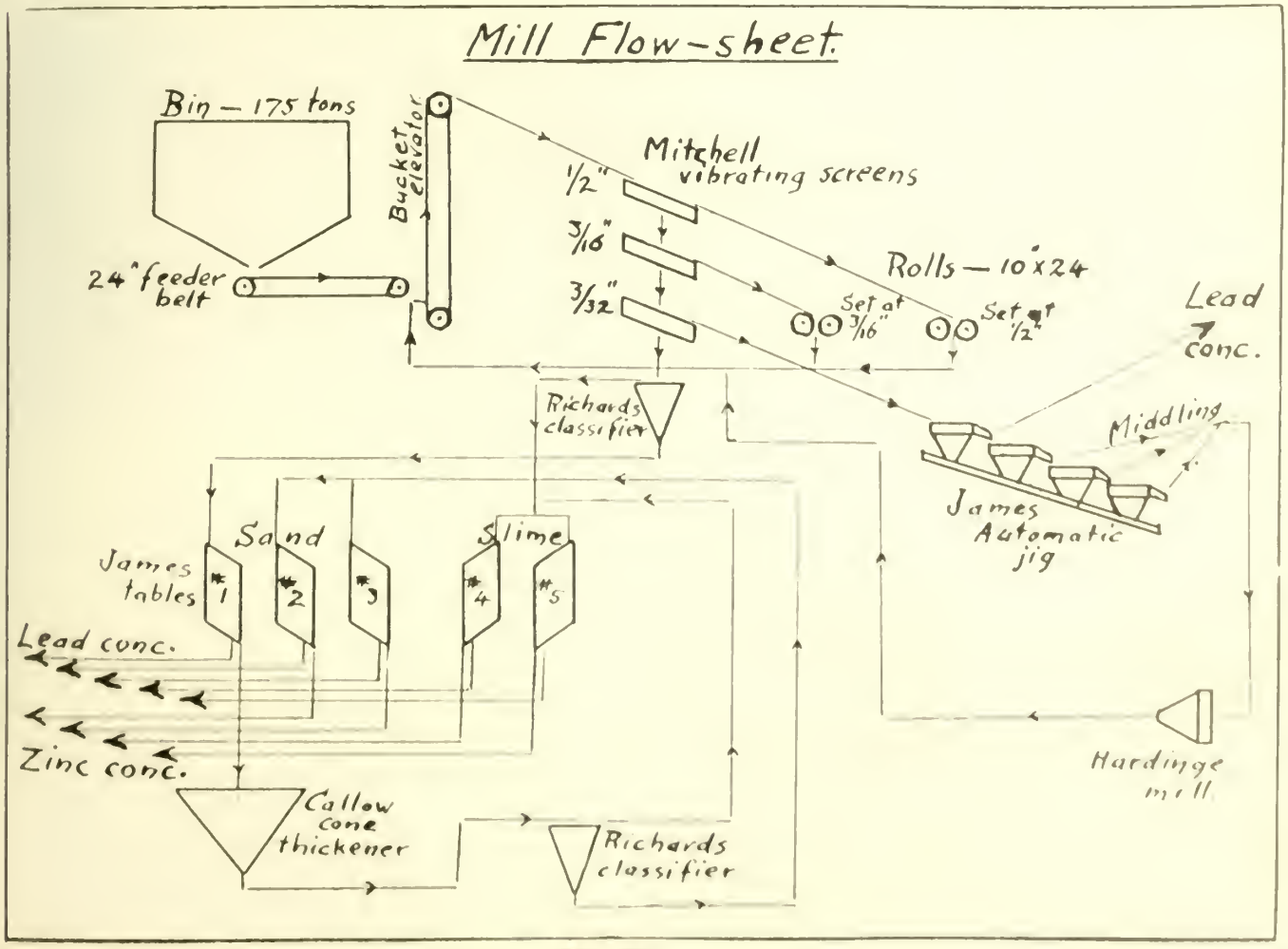


Fig. IV

trate and a clean zinc concentrate, the latter being at present stock piled. All tailings run in a flume to the Mississippi river close by, whence also the water for the mill is pumped.

A feature of this equipment worth special description, is the Mitchell Vibrating Screen. On the small area of the screen there is handled an amount of material that surprises one accustomed to stationary, or the ordinary shaking screens. A separate description with an illustration is given on another page.

Smelter.

Fig. VI gives a general view of the smelter. The reduction of galena to lead is one of the simplest of all

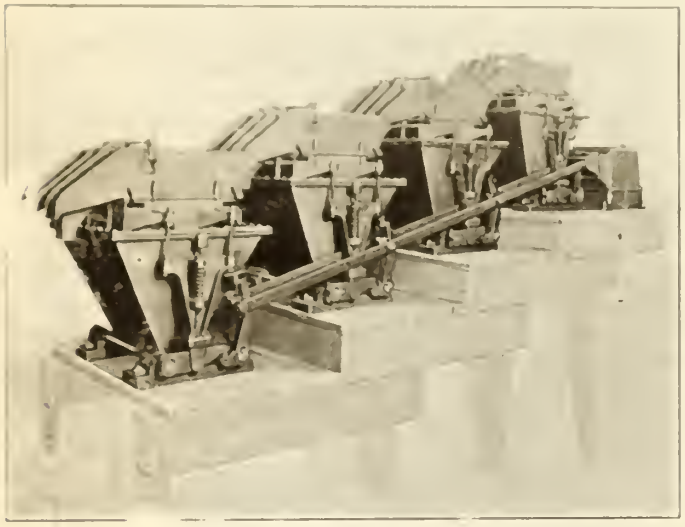


Fig. V.— James Automatic Jig.

smelting operations, and no complicated or expensive plant is necessary when the ore is clean. The Kingdon ore is so free from impurity that, without unusual precaution, an unusually pure pig lead is obtained. If a premium is to be had for pure lead, "Kingdon" brand should get it; in fact a premium of 2 cents per pound has already been paid for shipments made to the Hartt Accumulator Co. of St. Johns, Que., who require specially purg.lead for their storage batteries.

The furnace is an open-hearth of the modern type developed at the East St. Louis works by Mr. W. E. Newnan. The hearth has forced draft below and induced draft above, and a mechanical rabbler that operates over a hearth eight feet long, in place of the four foot length to which the hand-rabbled hearth is restricted. The hood is so designed as to eliminate al-

Fig. VI.—Smelter.

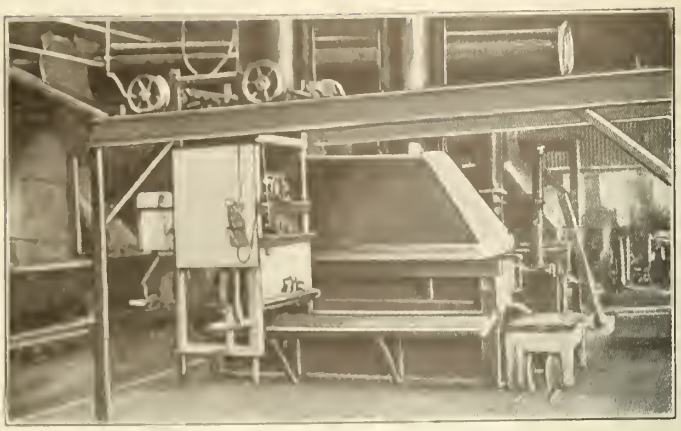


Fig. VII. St. Louis Hearth—rabble at beginning of trip.

most all danger of the lead poisoning from fumes so common with older hearths. Figs. VII and VIII show the furnace clearly.

The mill concentrate, containing from 78 to 82 per cent lead is fed by hand to the heart with a few per cent of coke breeze to assist in combustion and reduction. From 80 to 95 per cent of the head contained in the charge is reduced and tapped as crude pig lead, the remainder becoming "grey slag" (mostly oxides and sulphate of lead with some sulphide) which must be treated separately in a blast-furnace, and dust and fume, which are caught and re-treated on the hearth.

The gases, with dust and fume, from the hearth, pass first through goose-necks, to cool them, then through a flue or "trail", 700 ft. long, where the dust settles,

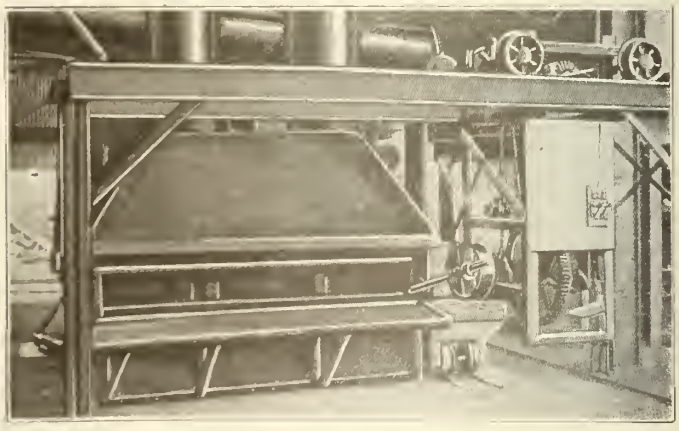


Fig. VIII.—St. Louis Hearth—rabble at end of trip.

to the bag-house, where the fume is filtered off. These bits of by-product apparatus are easily recognized in Fig. VI. So far as lead production goes, they form a closed circuit with the furnace.

The crude pig lead goes to a refining kettle, heated by a coal fire. It is "poled" with green poles, and when sufficiently freed from oxides and impurities, is siphoned to molds, and is ready for market.

At present the "grey slag" from the hearth is not treated at the plant. It is intended to erect by May of this year a small blast-furnace to reduce this material When this has been installed the metallurgical, as well as mining and milling equipment will be complete—a condition always desired and seldom attained by a mine manager.

During 1921, over three million pounds of lead was

marketed from this property. Improvements now completed will practically double the capacity of the plant, and will also reduce the cost per pound of producing the lead.

Thus we have, within thirty-five miles of our capital city, an enterprise that is a credit to those who have developed it, and to the Canadian mining profession. It is small, but it will grow, and we may rest assured that the growth will be a healthy one. Thanks are due Mr. R. R. Rose, superintendent of the mine, and his assistants and associates, for their courtesy to the writer, who can recommend heartily to brother engineers an inspection of the plant at the Kingdon Mine.

British Columbia Letter

Premier Acquires Control of B. C. Silver.

Stewart, B. C.—Particulars have been published of a deal under the terms of which the Premier Mining Company, Portland Canal District, acquires control of the holdings of the B. C. Silver Mines, Ltd. These consist of seventeen crown grants and fractions adjoining the Premier Company's property. The latter Company has obtained over half a million shares of the B. C. Silver Mines Ltd., paying for them something over $100,000. The British Canadian Silver Corporation Ltd., a British Company, controls the issued stock of the B. C. Silver Mines Ltd., and has an option on all the treasury stock, for which the consideration was 800,000 fully paid up shares in the British Canadian Silver Corporation. The latter corporation is capitalized at £400,000 sterling in 5 s. shares of which 1,000,07 shares are issued and fully paid up. The company's head office is at 19 St. Swithin's Lane, London, England. The British Columbia offices of the company are in the Pacific Building, Victoria.

Silverado.

The aerial tramway to the Silverado Group of Mineral Claims, Portland Canal, is in condition for operation. A snow trail has been constructed from the lower terminal to tidewater. With these facilities considerable high grade ore now ready will be shipped. Plans are being made for next season's development work.

Bear River..

A permanent bridge is to be constructed by the Provincial Department of Mines across the Bear River, replacing that which was washed out by recent floods. This will assure ready access to the mineral properties of the upper Bear River and its tributaries.

The Lion Group.

Alice Arm, B.C.—The Lion Group of Mineral Claims, situated a short distance from the town of Alice Arm, has been found to carry several small veins of high grade ore, which were uncovered in cross-cutting at a distance of 100 feet from the surface.—One hundred tons of high grade ore taken from the Esperanza Mine is ready for shipment.

Silver Ore on Bell Property.

Kaslo, B. C.—Improvements are to be made to the power plant of the Cork-Province Mine, with a view to permitting the Mine and Mill to be operated throughout the year. No work was done last year.—On the Bell Group of Mineral Claims, Wallace Mountain, a substantial vein of ore has been uncovered. Some samples have given returns of 6,000 ounces in silver to the ton. A shipment is being prepared for the Trail Smelter. The Bell adjoins the Sally Group which has shipped much valuable ore in past years and still is under development.

Ore Receipts at Trail.

Trail, B.C.—During the last ten days of the month of January there were shipped to the Trail Smelter of the Consolidated Mining & Smelting Co., 10,676 tons of ore and concentrates. The Company's properties were responsible for 10,469 tons. The Metallic Group, Silverton, contributed 24 tons; the Mollie Hughes, New Denver, 29 tons; the Utica, Adamant, 34 tons; and the Josie, Rossland, 120 tons.

Free re-entry of lead bullion.

Cranbrook, B. C.—An effort is being made to obtain suppor in British Columbia for the principle of a resosupport in British Columbia for the principle of a resowest Mining Association, recently held at Spokane, advocating a reciprocal agreement between Canada and the United States providing for free re-entry of lead bullion to the country of its origin. It is argued that its adoption would insure uninterrupted development and greater prosperity in all border districts. Whether there will be an enthusiastic and undivided endorsation of the proposal in this Province, however, is a moot question. There are some who take the view that it simply means smelting or refining in bond in the United States. The statement is made that it was virtually the same policy, applied by the United States to Mexican ores, which assisted in laying the foundations for flourishing industries in the former country. The tendency of Canadian legislation has been in the opposite direction. In 1901 the Canadian Government passed "An Act to provide bounties on lead refined in Canada." On the repeal of this measure the policy was approved of making straight payments to the smelters, ranging from $5 a ton (2,000 lbs.) of lead in 1902 to $3 in 1904. The British Columbia Government has offered a bounty of $3 a ton for pig iron produced in the Province from local ores and $1.50 a ton on pig iron produced in the Province from foreign ores.

Cedar Creek.

Quesnel, B. C.—Placer ground situated on Cedar Creek, which was found to contain good values last summer, has been bonded to outside interests, the intention being, it is stated, to undertake development during this year's open season. The new records are believed to be on the old channel of the Quesnel River.—The Del Eenador Mining Co. Ltd., also has acquired holdings in the same locality and is reported to be arranging to put a dredge to work as soon as weather permits.—Hydraulicing is to be undertaken by the Cariboo Gold fields Ltd., on Roses Gulch. A recent announcement has been made that the ground and equipment are ready for operations

Lucky Stakers at Mayo.

Victoria, B. C.—The Mayo Silver Camp, Yukon Territory, is glowingly described in the columns of a special edition of "The Dawson Daily News" just to hand. Present conditions and future prospects are dealt with in detail. Here is a sample: "Two thousand five hundred tons of silver ore from Keno in 1921 was but a starter, but, as mining camps go, a mighty big one. In 1922 it promises to be twice as large. Another year it may be ten times as large, and five years hence it may be smelters, concentrators, a railway and a camp to rival

Cobalt, Comstock, Leadville or Butte." A second of the shorter articles reads: "The most notable strike on Keno Hill, centre of the Yukon's greatest silver activity, made during 1921 was the finding of the lode on the west end or McQueston slope of the hill. The vein starts at timber line and has been traced along the hillside through the deep moss and trees pratically a mile, and ranges in width from five to fifteen feet between the walls. Numerous crosscuts have been made on the lode at frequent intervals for almost the entire length, revealing the ore in place at every point tapped. The discovery claim, the Ladue, at the north end of the lode, was found by David Cunningham and Ray Stewart, pioneer Yukon prospectors. A buckboard turned up a piece of float half a mile away and Joel Sunderland there found the vein on the Friendship claim. Other lucky stakers and owners on the lode were James Clark and Frank McNeill, while Raoul Binet and Dick Mercure were given one of the claims. All have bonded the ground for $10,000 to $65,000 a claim. A year ago one of the claims was offered in Dawson for $200 with no takers. The ore assays 200 to 500 ounces in silver to the ton."

Northern Ontario Letter

THE GOLD MINES.

To all those who have not been able to visit the Porcupine gold area during the past few months, the magnitude of the present outlook may be difficult to grasp. Ore reserves are increasing to an important extent, costs are declining a little, and there is every evidence that milling facilities in the aggregate will be increased by approximately fifty per cent within less than a year.

Hollinger.

It has been reported in usually well-informed circles that the Hollinger is now considering the question of increasing its dividend from one per cent. every four weeks as at present, to one and a half per cent. This would amount to 19½ per cent. annually, and would require the distribution of $4,689,000 a year, a record which it is believed would not be difficult for the Hollinger in view of the fact that present income is actually at the rate of over one million dollars a month. Even now the company is taking on additional staff in connection with preparing plans and specifications for increasing the capacity of the milling plant to close to 7,000 tons of ore daily. The mill has recently averaged a little over 4,000 tons per day.

Rochester.

On the Rochester property, the Nipissing continues to carry on diamond drilling operations. The question is still undecided as to whether or not the option will be exercised, but the odds appear to be in favor of this being the final result.

Schumacher.

F. W. Schumacher is reported to be asking a dollar a share for the controlling block of 1,300,000 shares in the Shumacher Gold Mines, but the negotiations have not yet taken a decisive turn.

McIntyre.

The McIntyre-Porcupine is proceeding with preliminary work in connection with enlarging its milling plant. The listing of the shares in New York and the plan to alter the par value from $1.00 to $5.00 per share serves to advertise the mine. As a consequence of this the excellent merit of the enterprise has caused the quotations for the shares to rise.

Dome.

The Dome Mines continue to occupy the centre of the stage in point of sensational results in its mill. Ore has recently been found to range from $11 to $17 per ton and net profits are accumulating at a rate never before experienced by this company. One of the assistant provincial geologists has declared that the amount of ore actually blocked out would alone keep the mill running at full capacity for three or four years.

Longyear drilling.

The Longyear Company continues to acquire mining claims under option in the area lying along the possible south-westerly continuation of the auriferous zone which passes over the Hollinger and McIntyre areas. This company it said to be taking claims under an agreement to carry on exploration work by diamond drilling and to have an option to buy the ground within a specified time on a basis of around $100 per acre. This would amount to $4,000 per each 40 acre claim taken up.

Gold Reef.

Reports continue to circulate that steps may be taken to reopen the Gold Reef property. Something definite is expected shortly.

Additional Power.

Coming quickly on the heels of the dismissal of litigation between the Hollinger Consolidated Gold Mines and the Northern Canada Power Company is the information that the work of providing additional power requirements for the Porcupine field has actually commenced.

It was learned here today that the work of clearing the way for the power transmission line has been started, while supplies will be shipped in as rapidly as required in connection with the power development itself. This means a great deal to the gold mining industry of Porcupine, the significance of which is contained in an official statement made to this paper, namely, that there is already sufficient power to keep the mines running at present capacity until the spring break-up of the ice in the lakes and rivers and that the water storage facilities will then assure a full supply of energy until the end of this year. Mr. J. H. Black state that within about nine months after commencing the development of Sturgeon Falls the new "juice" could be turned on.

For the first time in their history, therefore, the gold mines of the Porcupine district are confronted with not a single obstacle and the world is assured of results which will probably make the achievements of the past in gold mining in Ontario appear as comparatively small. In support of this belief are ore reserves which now exceed seventy-five million dollars and with every gold producing mine in the country planning mill enlargements of from twenty to one hundred per cent.

Kirkland Lake Area.

The growth of the Kirkland Lake mining field is steady and substantial and promises to occupy for many years a place of second importance only to the Porcupine district as a gold producer.

Lake Shore.

While the management of the Lake Shore has refrained from making estimates of ore reserves it is an interesting fact that in taking the available details of lengths, breaths and average gold contents of known ore bodies that conservative engineers are expressing the opinion that at least 400,000 tons of ore may be estimated which, at a value of $15 per ton would amount to $6,000,000. In making these estimates, an interest-

ing comparision may be made with the McIntyre-Porcupine mine, which shows the physical condition of the Lake Shore and the McIntyre to be on almost an equal basis. The one handicap for the Lake Shore is in having a mill of only 70 tons daily capacity as against 550 tons daily on the McIntyre and with an increase being made to the latter which will permit 800 tons daily to be handled.

Tough-Oakes.

The work of preparing the Tough-Oakes and Burnside properties of the Kirkland Lake Proprietary (1919) Ltd. for production in the early spring is proceeding satisfactorily and the mill will likely be placed in operation late in April.

At a depth of 300 feet on the Sylvanite property the result of work is favorable and it appears to be only a matter of time until this mine will take its place among the producers.

Argonaut.

Official advice to the Journal about the Argonaut Gold is reassuring. The work of continuing the shaft to a depth of 500 feet will commence at once. Diamond drilling will be done from the present depth of 300 feet. A ball mill has been purchased and lumber is being sawed for the new mill. About 75 p.c. of the material will be on the ground before the break-up.

Hunton.

A special meeting of the shareholders of the Hunton-Kirkland will be held this week for the purpose of ratifying a merger with the Gibson-Duncan claims.

Miller Independence.

At the sixth annual general meeting of the Miller Independence Mines, Ltd., held in Dayton, a report in detail was submitted by the general manager, W. E. Simpson, as well as a financial statement by John C. Schaefer, secretary and treasurer.

The $50,000 required during the past year for carrying on development operations and for diamond drilling had all been subscribed in a remarkably short time, and a satisfactory financial balance is reported to have been shown for future work.

The manager's report dealt exhaustively with the results of practical operation, and showed that early in the year some highly spectacular ore, showing both free gold and tellurides, had been developed in sinking an inclined shaft to a depth of 55 feet at which point operations were suspended pending the inauguration of a campaign of development with the diamond drill. Extensive cross-cutting was done at the 500-ft. level to within 150 feet of the northern boundary. A total of 2,974 feet of diamond drilling was done during the year and the work continued during January making a total of 3,257 feet in this campaign to date. A total of eight holes were completed, all at the 500 ft. level, three to the west to test horizontally at this depth the porphyry which at surface is asociated with the "Jumbo" vein; two holes running east to the porphyry at the "C" shaft, with one east and one west, both dipping at an angle of 45 degrees.

Mr. Simpson stated that although a large number of veins have been cut both in cross-cutting and by diamond drill no one of these is of sufficient size in itself to yet justify the erection of a large mill. The suggestion was offered by Mr. Simpson that, instead of deeper sinking as was at one time proposed and, seeing that the company had done a very large amount of development work single handed in the Boston Creek district while all other surrounding properties without exception continued to remain idle, it might be advisable to become interested in other properties of merit in other districts which might be likely, in the near future, to become centres of "co-operative activity."

The old board of directors was re-elected with Dr. Howard V. Dutrow filling the only vacancy created by the permanent absence of Mr. Vandervoort.

The meeting was adjourned pending the report of a committee which will inquire into the possibilities of securing new property as suggested by Mr. Simpson. The adjourned meeting will be held on April 6th.

THE SILVER MINES.

Continued favorable developments on the Nipissing mine, together with good results at depth on the Violet property of the La Rosa and on the Victory Silver Mines as well as on the Keeley Silver Mines and the Haileybury Frontier in South Lorrain combine to offer good promise of prosperity during the balance of this year in connection with the silver mining industry. Although no further cut has been made in wages since the reduction of one year ago yet it is a point of great importance that production costs are steadily declining.

McKinley-Darragh.

Reports have been current this week that the McKinley-Darragh Company of Cobalt is becoming interested in the Bidgood Gold Mines of Kirkland Lake. The report entirely unofficial at the time of writing. However, the Journal correspondent has secured the information that certain "individuals" who are identified with the McKinley-Darragh have for some time been interested as stockholders of the Bidgood and it is not improbable that this fact may have given rise to the current reports that the McKinley-Darragh Company itself is becoming interested.

Silver-Cliff.

In a winze at the lower level of the old Silver Cliff mine a promising vein has been encountered. Meanwhile, ore is being sent from the property regularly and fair tonnage has been found to carry about 23 ounces of silver to the ton.

Bailey.

About 60 feet of cross-cutting remains to be done at the 4th level of the Bailey Silver Mines to reach the Big Pete vein. A number of small veins have been encountered at this level but no drifting will be undertaken until such time as the cross-cut reaches its main objective.

Coniagas.

Considerable interest centres around the plan of the Coniages to diamond drill the Ruby property in the township of Bucke. There are not a few mining men who are of opinion that the geological structure peculiar to the township of Bucke might reasonably prove to be profitable ground in which to explore. Were one success to be achieved in this area it is probable that a general revival of activity would follow. The nearest approach to commercial success heretofore in this section was on the Green Meehan which property was operated by Edwards & Wright. There are promising silver showings on the Ruby.

Crown Reserve.

The Crown Reserve is attaching considerable importance to its newly acquired property in the Larder Lake district, and the interest of the stockholders will centre particularly on this new venture for the next several months. The work of equipping the Larder Lake ground with a mining plant is proceeding satisfactorily.

Keeley.

Major Bell of the Keeley Silver Mines will return from England about the end of February, at which time it is expected a general report on the mine will

be available, showing the results achieved during the past ten or twelve months.

Beaver.

Another visit by Frank L. Culver to Cobalt has strengthened the belief that the question of opening the Beaver mine this spring in under careful consideration. It is known that the Beaver is in quite satisfactory physical condition and was not allowed to run behind in development work prior to curtailment of operations. A large amount of medium grade ore is in sight and good profits appear to be assured at such time as the directorate decides to go ahead.

Nipissing.

Due to the mill being closed down for the first week of January, which is the usual custom in order to make the annual clean-up, the production of silver from the Nipissing was lower than during preceding months. Development work during the period, however, continued favorable, the following being the regular monthly statement as issued by Hugh Park, manager, to the president and directors:—

"During the month of January the company mined ore of an estimated net value of $139,622 and shipped bullion from Nipissing and custom ores of an estimated net value of $364, 579. The value of the month's silver production was estimated at 66 cents per ounce.

"The most encouraging feature of the month's work underground was the new development on vein 251. The winze put down from the second level of 63 shaft encountered Keewatin at a depth of 45 feet. The ore, however, continued for another eight feet and a level was stablished at 53 feet. The station has been completed and the west drift at the new level has been driven 25 feet, the vein over this distance having an average width of three inches and assaying 3442 ounces. The east drift is in 15 feet but all asseys have been low grade, the ore being slightly above the drift. The vein in the winze had an average assay of 7,573 ounces over a width of three inches for the 53 feet. In the level above, where the vein was first encountered, drifting developed an ore shoot 70 feet long averaging 2¾ inches and assaying 4,563 ounces.

"Other work at the 63 shaft consisted of exploration and some drifting on a few small low-grade veins. Work at 73 shaft produced no new developments during the month. At 64 shaft, operations consisted mainly in putting up a number of raises, some for developing new portions of the vein, which proved to be satisfactory, and some to facilitate future stoping.

"Exploration work is now proceeding at shaft 128 and is being done from a new level established at 75 feet. Former work had been done at a depth of 125 feet, but work in all directions was somewhat restricted due to the area of conglomerate occuring in a bowl-shaped basin.

"The low grade mill treated 6,222 tons. The mill was shut down during the first week of the month, due to the annual clean-up, which fact reduced both tonnage treated and the month's production. The high grade mill treated 109 tons. The refinery shipped 544,414 fine ounces of bullion."

Statement of Ore Shipment Over The T. & N. O. Ry. for the Month Ending January 31st, 1922.

(In tons of 2,000 lbs.)

Cobalt Proper.	Tons.	
1. Bailey	32.00	
2. Coniagas	43.89	
3. La Rose	34.08	
		109.97

The above shipments were made to the following companies:

United States.

American Smelting & Refining Co. Perth Amboy	43.89	
Pennsylvania Smelting Co. Carnegie	66.08	
		109.97

Note.

Jan. 9th. Highest price of Silver During Month	66.250
Jan. 3rd. Lowest price of Silver During Month	64.125
Average price of Silver During Month	65.450

MINING QUOTATIONS.

Quotations on Active Stocks on Standard Stock Exchange, Toronto, for week ending Feb. 21st, 1922.

Silver			
Adanac Silver Mines, Ltd.	1 ¼	1 ¼	1 ¼
Bailey	2 ½	2 ½	2 ½
Beaver Consolidated	24 ¼	20 ¼	24 ¼
Chambers-Ferland	3 ½	2 ¾	3
Coniagas	1.30	1.20	1.27
Crown Reserve	16	14 ¾	15 ½
Gifford	¾	⅝	⅝
Great Northern	2 ¼	2 ¼	2 ¼
Hargraves	¾	½	¾
La Rose	38 ½	36 ½	38
McKin.-Dar.-Savage	19 ½	19	19 ½
Nipissing	6.35	6.30	6.35
Ophir	2 ¾	1 ⅞	2
Peterson Lake	5	5	5
Temiskaming	32 ½	31 ½	32 ½
Trethewey	4 ¾	3	4 ¾
Gold			
Apex	1 ⅞	1 ½	1 ⅞
Atlas	16 ½	12	16 ½
Argonaut Gold	39	39	39
Dome Extension	84	84	84
Dome Lake	6 ¾	5 ½	6 ¾
Dome Mines	24.45	24.00	24.40
Gold Reef	2 ⅞	2 ¼	2 ⅞
Hattie Gold M. Ltd.	21 ½	20	21
Hollinger Cons.	8.60	8.46	8.60
Hunton Kirkl'd G.M.	9	6 ½	6 ½
Inspiration	2 ½	2 ½	2 ½
Keora	9 ½	9	9
Kirkland Lake	34	30	34
Lake Shore M. Ltd.	1.51	1.43	1.51
McIntyre	2.65	2.53	2.65
Moneta	12	10 ¾	10 ¾
Newray Mines, Ltd.	9 ½	7 ½	7 ¾
Porcupine Crown	19	17	18 ¾
Porcupine V.N.T.	25 ½	23	24
Preston East Dome	6	5	6
Schumacher	36 ½	35	35 ¾
Teck-Hughes	31	29	30
Thompson Krist	4	1 ⅞	4
Thompson Krist	4	1 ⅞	4
West Dome	8	7	8
West Tree Mines, Ltd.	2 ½	2 ½	2 ½
Wasapika Gold M. Ltd.	4 ¼	3 ½	3 ½
Wright Har.	1.85	1.85	1.85
Miscellaneous			
Bothwell Oil	12	11 ½	12
Rockwood Oil, Gas	1	⅝	⅝
La Paz	1.75	1.70	1.70

The Canadian Miners' Buying Directory.

Acetylene Gas:
Canada Carbide Company, Ltd
Prest-O-Lite Co. of Canada, Ltd

Acetylene Welding:
The Toronto Iron Works, Ltd.

A.C. Units:
Powley & Townsley, Limited.

Agitators:
The Dorr Co
Can. Chicago Bridge & Iron Co., Ltd.
Horton Steel Works, Limited.

Air Compressors:
Belliss & Morcom, Ltd.
Laurie & Lamb
Sullivan Machinery.

Air Hoists:
Canadian Ingersoll-Rand Co., Ltd
Mussens, Limited.

Air Receivers:
The Toronto Iron Works, Ltd.

Alloy and Carbon Tool Steel:
Peacock Brothers Limited.

Alternators:
MacGovern & Co.

Aluminium:
Spielman Agencies, Itegd

Amalgamators:
Northern Canada Supply Co.
Mine and Smelter Supply Co.
Wabi Iron Works.

Antimony:
Canada Metal Co.

Antimonial Lead:
Pennsylvania Smelting Co

Assayers' and Chemists' Supplies:
Dominion Engineering & Inspection C...
Lymans, Limited
Mine & Smelter Supply Co.
Pennsylvania Smelting Co.
Stanley, W. F. & Co., Ltd.

Ash Conveyors:
Canadian Link-Belt Company

Ashes Handling Machinery:
Canadian Link-Belt Co., Ltd

Assayers and Chemists:
Milton L. Hersey Co., Ltd
Campbell & Deyell
Ledoux & Co.
Thos. Heyn & Son
C. L. Constant Co.

Asbestos:
Everitt & Co.

Balls:
Hull Iron & Steel Foundries, Ltd
Peacock Brothers Limited.
The Wabi Iron Works.
The Hardinge Conical Mill Co
The William Kennedy & Sons, Ltd.

Ball Mills:
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd
Mine & Smelter Supply.
The Wabi Iron Works.

Babbit Metals:
Canada Metal Co.
Hoyt Metal Co.

Ball Mill Feeders:
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd
Mine & Smelter Supply.

Ball Mill Linings:
Hardinge Conical Mill Co.
The William Kennedy & Sons, Ltd
Peacock Brothers, Limited
Hull Iron & Steel Foundries, Ltd
Mine & Smelter Supply.

Balances — Assay & Analytical:
Mine & Smelter Supply.
The William Kennedy & Sons, Ltd

Belting—Leather, Rubber and Cotton:
Canadian Link-Belt Co., Ltd
Northern Canada Supply Co
Jones & Glasco.

Belting:
R. T. Gilman & Co
Gutta Percha & Rubber, Ltd

Belting—Silent Chain:
Canadian Link-Belt Co., Ltd
Hans Renold of Canada, Limited Montreal.
Jones & Glassco (Itegd)

Belting (Transmission):
Goodyear Tire & Rubber Co

Belting (Elevator):
Goodyear Tire & Rubber Co

Belting (Conveyor):
Goodyear Tire & Rubber Co
Gutta Percha & Rubber, Ltd

Bins and Hoppers:
The Toronto Iron Works, Ltd.
Can. Chicago Bridge & Iron Co., Ltd.
Horton Steel Works, Limited.

Blasting Batteries and Supplies:
Canadian Ingersoll-Rand Co., Ltd
Mussens, Ltd.
Canadian Explosives, Ltd.
Powley & Townsley, Limited.

Bluestone:
The Consolidated Mining & Smelting Co
The Coniagas Reduction Co., Ltd.

Blowers:
Canadian Fairbanks-Morse Co., Ltd
Northern Canada Supply Co.

Boilers:
Canadian Ingersoll-Rand Co., Ltd
Marsh Engineering Works
R. T. Gilman & Co.
The John Inglis Company
Wabi Iron Works.
The William Kennedy & Sons, Ltd.

...de Vitriol (Coniagas Red):
Canadian Fairbanks-Morse Co., Ltd

Bortz and Carbons:
Diamond Drill Carbon Co.

Boxes, Cable Junction:
Standard Underground Cable Co. of Canada, Ltd.
Northern Electric Co., Ltd.

Brazilian Rough Diamonds:
Diamond Drill Carbon Co.

Brazilian Mica:
Diamond Drill Carbon Co

Buggies, Mine Car (Steel)
Hendrick Manufacturing Co

Brazilian Balas:
Diamond Drill Carbon Co

Brazilian Rock Crystal:
Diamond Drill Carbon Co.

Brazilian Tourmalines:
Diamond Drill Carbon Co

Brazilian Aquamarines:
Diamond Drill Carbon Co.

Bridges—Man Trolley and Rope Operated—Material Handling
Canadian Mead-Morrison Co., Limited

Bronze, Manganese, Perforated and Plain:
Hendrick Manufacturing Co.

Buckets:
Canadian Ingersoll-Rand Co., Ltd.
R. T. Gilman & Co.
Hendrick Manufacturing Co
Canadian Link-Belt Co., Ltd
Marsh Engineering Works
Mussens, Ltd.
MacKinnon Steel Co., Ltd.
Northern Canada Supply Co.
The Wabi Iron Works
The William Kennedy & Sons, Ltd

Buckets, Elevator:
Canadian Link-Belt Co., Ltd
Hendrick Mfg. Co
Peacock Brothers Limited
The William Kennedy & Sons, Ltd

Cable—Aerial and Underground:
Canada Wire & Cable Co
Northern Canada Supply Co
Standard Underground Cable Co. of Canada, Ltd
Peacock Brothers, Limited

Cableways:
Canadian Mead-Morrison Co., Limited
Fraser & Chalmers of Canada, Ltd
Mussens, Ltd
The Wabi Iron Works
R. T. Gilman & Co

Cages:
Canadian Ingersoll-Rand Co., Ltd Montreal Que
Northern Canada Supply Co.
Fraser & Chalmers of Canada, Ltd
The Mine & Smelter Supply Co
Mussens, Ltd
...
The William Kennedy & Sons Ltd

CORRESPONDENCE.

Prospecting in Ontario.

To the Editor.
Canadian Mining Journal.

Sir,—Today I read your leading editorial: "The Journal and its readers." In answer to your suggestion, I offer this prospector's mite.

I wish to call attention to the fact that there is a general continuity of our mining camps, located along breaks or fractures, running in a general direction, E. N. E., clean across Northern Ontario, said breaks or fractures being caused by the cooling and contracting of the granite. These fractures afforded escape-ways for volcanic ejections. This prospector places himself on record as predicting a series of mining camps strung out along these breaks.

The most southerly break can be traced from Lake Temiskaming near Haileybury, through Cobalt, Timagami, Emerald Lake (Golden Rose), Wahnapitae and the Sudbury nickel area, which is right on the contact. Further to the west and south the old rocks are pretty much capped over by the sediments.

The next break can be followed from Larder Lake, near the Quebec boundary, through Kirkland Lake, Swastika, Matachewan, Gowganda, East Shining Tree, West Shining Tree, and is plainly seen crossing the track on the C.N. Ry north of Sudbury between Makeva and Gogama, flanked on both sides by the granite, continuing on into Sehist Lake, and passing to the north of Bisco on the C. P. R. it is again pretty much covered up by the sediments through the Missisauga.

The next parallel break, starting from Abitibi, crosses the T. N. O. Ry. at Kelso, on into Porcupine (where the prophyry kicks in and does the world some good) across the Matagama River, into Bristol and Whitesides, and is again plainly seen flanked by the granite crossing the Canadian National north of Sudbury at Ground Hog between Tionaga and Foleyett. It is again seen crossing the C. P. R. at Missinabi and then down into Goudreau. These are just a few of those closer to home. North of Lake Superior there are quite a bunch of them.

In following along these breaks, which is very slow work and is hard on dry goods, when we come to where the prophyries have intruded the volcanics and there are signs of shearing and schisting, we usually make camp and hunt around a while for the root of all evil—Gold.

Yours etc.

Tom Saville.

Sudbury Feb. 15, 1922.

To the Editor,
Canadian Mining Journal.

Sir,—After reading Mr. C. M. Campbell's interesting though pessimistic letter in your issue of February 3rd, in which he states the mineral resources of the Dominion are extremely limited, and the accesible parts have been already prospected, I made up my mind to pack up and go to the farm and try to forget about mining opportunities in Canada, and in grabbing the last number of the Bulletin of the Institute, which I was including in my baggage—more for sentiment than anything else—my eye caught the following words on the inside last page over the signature of the Deputy Minister of Mines for Ontario:—

"The pre-Cambrian, representing 70 per cent of the area of the Province is pre-eminently the metal-bearing formation of America. It is estimated that only about 10 per cent of this promising area in Ontario has been prospected."

While meditating over this a few pages turned and I noticed a similar statement of the Minister of Mines for Quebec to the effect that that province comprises an area of 706,834 square miles ..... 90% of which is underlain by rocks of pre-Cambrian age..... and only an insignificant proportion of this immense area has been touched by the prospector.

I did not pursue the matter further as I am hoping that we may have the pleasure of arranging for these three gentlemen to sit at the same table at the banquet of our Annual Meeting, when perhaps this seeming divergency may be satisfactorily disposed of. In the meantime I will postpone my departure to the farm for another season.

Yours,

H. H. Claudet.

Ottawa, Feb. 18th, 1922.

To the Editor,
Canadian Mining Journal.

Sir,—I have received a clipping from the issue of "The Northen Miner" of the 24th of December which contains the following:

"Look over of the men who are to represent the branch of mining engineers in the provisional council: C. R. Camsell, of Ottawa, H. E. T. Haultain, of Toronto, Jas. McEvoy, of Toronto."

The point is well taken. The selection of two geologists with a professor between them to administer an Engineers' Bill does seem ill advised. Less than this put the Canadian Mining Institute to sleep, but it will be unfortunate if personalities are allowed to interfere with proper consideration of such an important movement as is this proposed legislation for Engineers.

Yours etc.

H. E. T. Haultain.

Toronto, Feb. 14.

BLUE SKY LAWS.

A Good Substitute.

The following despatch from Toronto may serve to illustrate the fact that we have already on the statute-books the means of dealing with those that issue and sell bogus shares. Possibly we have "blue sky laws" already in force, without realize it.

P. W. McAffrey and J. C. Ryan came up today before Judge Coatsworth in the Criminal Court for sentence for conspiracy to defraud and for issuing a false prospectus in connection with the Ryan Anti-Glare Light Company, organized at $1,000,000. McAffrey goes to Kingston penitentiary for five years and Ryan for three years.

"The case is one with which the court cannot deal lightly," said His Honor, "These two men received large sums of money from nearly 175 people, and in most instances 25 per cent was handed over to the men who sold the stock. A large proportion of the people who bought the stock were poor people whose savings were sought for this investment and which they thought would realize a considerable sum of money."

Canadian Miners' Buying Directory.—(Continued)

Cables—Wire:
Standard Underground Cable Co. of Canada, Ltd
Canada Wire & Cable Co.
R. T. Gilman & Co.

Cable Railway Systems:
Canada Wire & Cable Co.

Cam Shafts:
Hull Iron & Steel Foundries, Ltd
Peacock Brothers Limited
The William Kennedy & Sons, Ltd.

Car Dumps:
Sullivan Machinery Co.
R. T Gilman & Co.

Carbide of Calcium:
Canada Carbide Company, Ltd.

Cars:
John J. Gartshore
MacKinnon Steel Co., Ltd.
Northern Canada Supply Co.
Marsh Engineering Works
Peacock Brothers, Limited
Mussens, Limited
Powley & Townsley, Limited.
R. T. Gilman & Co.
The William Kennedy & Sons, Ltd.

Car Wheels and Axles:
Canadian Car Foundry Co., Ltd
Burnett & Crampton
Hull Iron & Steel Foundries, Ltd
John J. Gartshore
Marsh Engineering Works, Ltd.
Peacock Brothers Limited
The William Kennedy & Sons, Ltd.

Carriers (Gravity):
Jones & Glassco

Castings—Brass
The Canada Metal Co., Ltd

Castings (Iron and Steel)
Hull Iron & Steel Foundries, Ltd
Peacock Brothers Limited.
The William Kennedy & Sons, Ltd.

Cement Machinery:
Hadfields, Limited
Hull Iron & Steel Foundries, Ltd.
Burnett & Crampton
The William Kennedy & Sons, Ltd

Chains:
Jones & Glassco
Northern Canada Supply Co.
Canadian Fairbanks-Morse Co., Ltd
Canadian Link-Belt Co., Ltd.
Greening, B., Wire Co., Ltd.

Chain Drives:
Jones & Glassco (Regd.)

Chain Drives—Silent and Steel Roller:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal (
Jones & Glassco) Regd.).

Chemical Apparatus:
Powley & Townsley, Limited.

Chemists:
Canadian Laboratories
Campbell & Deyell
Thos. Heyes & Sons
Milton Hersey Co.
Ledoux & Co.
Constant, C. L. Company

Chrome Ore:
The Electric Steel & Metals Co
Everett & Co.

Classifiers:
Mussens, Limited
Fraser & Chalmers of Canada, Ltd
The Wabi Iron Works
R. T Gilman & Co
The Dorr Company

Clutches:
Canadian Link-Belt Co., Ltd
Hans Renold of Canada, Limited, Montreal (

Coal:
Dominion Coal Co
Nova Scotia Steel & Coal Co.

Coal Cutters:
Sullivan Machinery Co
Canadian Ingersoll-Rand Co., Ltd
Peacock Brothers, Limited

Coal Crushers:
Canadian Mead-Morrison Co., Limited
Canadian Link-Belt Co., Ltd
Peacock Brothers Limited

Coal Mining Explosives:
Canadian Explosives Ltd
Giant Powder Company of Canada, Ltd

Coal Mining Machinery:
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd
Canadian Ingersoll-Rand Co., Ltd.
Sullivan Machinery Co.
Marsh Engineering Works
Hadfields, Ltd.
Hendrick Mfg. Co.
Powley & Townsley, Limited.
Mussens, Limited

Coal and Coke Handling Machinery
Canadian Link-Belt Co., Ltd.
Powley & Townsley, Limited.

Coal Pick Machines:
Sullivan Machinery Co.

Coal Screening Plants:
Canadian Link-Belt Co., Ltd.

Cobalt Oxide:
Coniagas Reduction Co.
Everitt & Co.

Compressors—Air:
Smart-Turner Machine Co.
Canadian Ingersoll-Rand Co., Ltd
Mussens, Limited
Peacock Brothers, Limited

Concrete Mixers:
Gould, Shapley & Muir Co., Ltd
MacGovern & Co., Inc
Mussens, Limited

Condensers:
Smart-Turner Machine Co.
Northern Canada Supply Co.
Bellhss & Morcom, Ltd.
Laurie & Lamb
Peacock Brothers, Limited

Concentrating Tables:
The Mine & Smelter Supply Co
Deister Concentrator Co

Converters:
Northern Canada Supply Co.
MacGovern & Co., Inc.

Conveyors—McCaslin Gravity Bucket:
Canadian Mead-Morrison Co., Limited

Contractors' Supplies:
Canadian Fairbanks-Morse Co., Ltd

Consulters and Engineers:
Hersey Milton Co., Ltd.

Conveyors:
Canadian Link-Belt Co., Ltd.
Jones & Glassco (Regd.)
Powley & Townsley, Limited.

Conveyor Belts:
Gutta Percha & Rubber, Ltd

Conveyor Flights:
Canadian Link-Belt Co., Ltd
Hendrick Mfg. Co., Ltd.

Conveyor—Trough—Belt:
Canadian Link-Belt Co., Ltd.
Hendrick Mfg. Co
Mussens, Limited
Jones & Glassco (Roller, Belt and Chain)
Hendrick Mfg. Co.

Conical Mills:
Hardinge Conical Mill Co

Copper:
The Canada Metal Co., Ltd.
Consolidated Mining & Smelting Co

Couplings:
Hans Renold of Canada, Limited, Montreal, (

Cranes:
Canadian Mead-Morrison Co., Limited
Canadian Link-Belt Company
Peacock Brothers, Limited
R. T. Gilman & Co.
Smart Turner Machine Co

Crane Ropes:
Allan Whyte & Co.
Canada Wire & Cable Co
Greening, B., Wire Co., Ltd
Peacock Brothers, Limited

Crucibles:
The Mine & Smelter Supply Co.

Crusher Balls:
Canada Foundries & Forgings, Ltd
Hull Iron & Steel Foundries, Limited Hull Que
Osborn, Sam'l (Canada) Limited
Peacock Brothers, Limited
Swedish Steel & Importing Co., Ltd
The William Kennedy & Sons, Ltd

Crushers:
Canadian Steel Foundries, Ltd
Hull Iron & Steel Foundries, Ltd
Hardinge Conical Mill Co
Lymans Ltd
Mussens Limited
Osborn, Sam'l (Canada) Limited
The Electric Steel & Metals Co., Ltd.
R. T. Gilman & Co.

THE MITCHELL SCREEN.

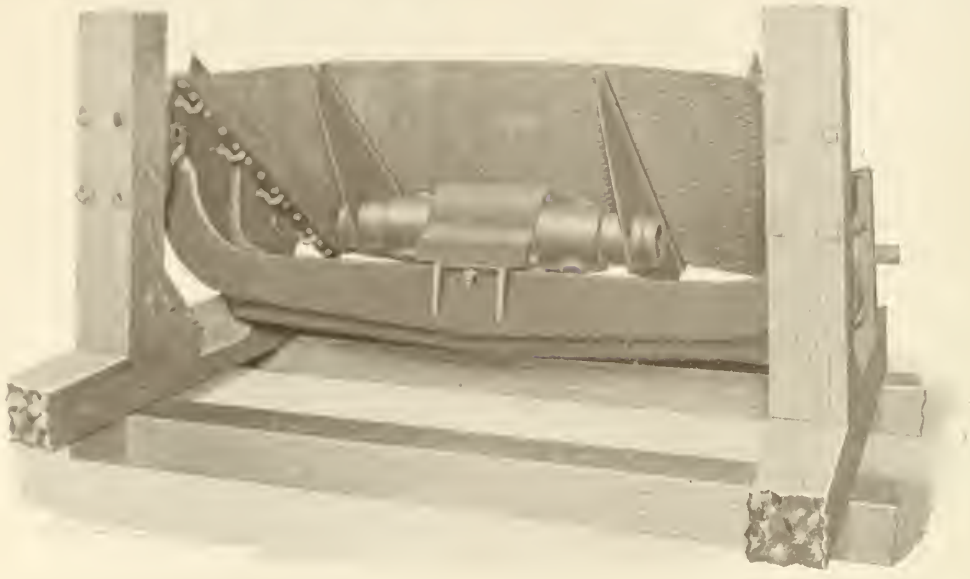
The No 1 Mitchell Screen is designed for coarse screening. The Vibrating Unit is held in a ball and socket joint seated in a cast iron frame and the vibrations are transmitted to the screen cloth through steel arms, over which the cloth is stretched.

The type 5 Mitchell Screen combines vibratory, sifting and rotary motions. The vibrator, screen frame and screen cloth are suspended as a unit by a ball and socket bearing, with perfect freedom of movement in any direction, communicating to the screen surface over its entire area the ideal screening action.

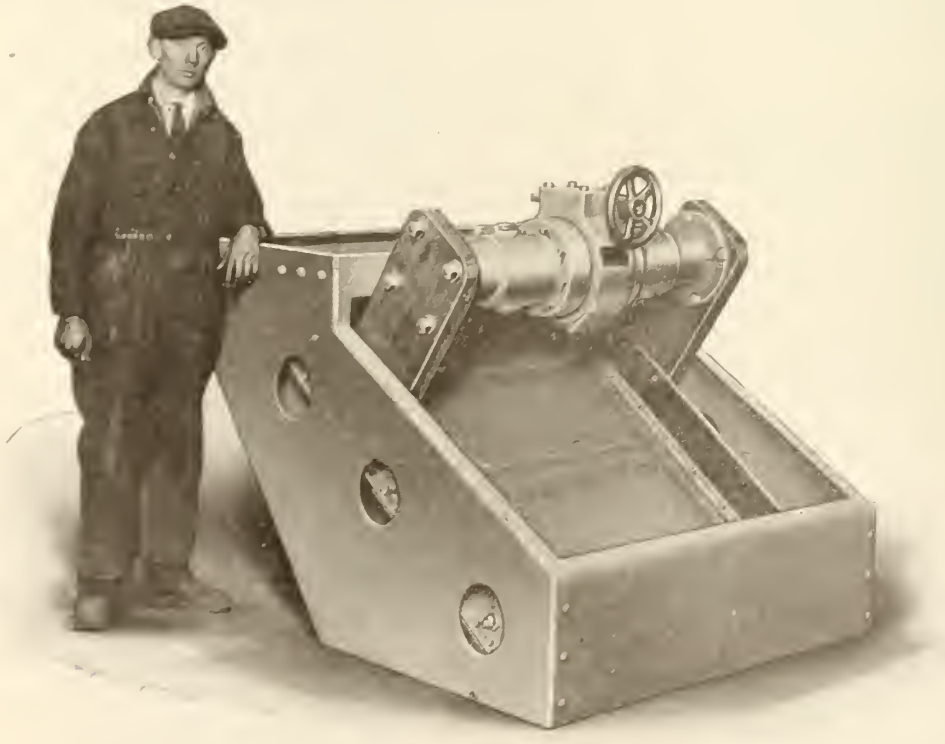
The Mitchell Vibrating Screen is revolutionary, yet perfectly sound and practical. The operating mechanism consists of one horse-power motor enclosed in a dust and moisture-proof housing. Each extension of the motor shaft has keyed to it a ball cage containing a number of steel balls. The balls in the two cages are 180 degrees apart. Encircling the ball cages and pressed into the housing are hardened steel ball races. When the shaft rotates, centrifugal force keeps the balls in contact with the races, resulting in an eccentric motion of the vibrator at each end.

The three motions imparted to the screen cloth are positive and powerful. There are 3600 vibrations a minute, driving the screen into the material and forcing the small particles through the mesh. There is also a sifting action in a direction at right angles to the vibration, rolling the particles toward the screen openings, and in addition a rotary motion that insures screening efficiency.

The screen is manufactured in Canada by the Engineering Equipment Co., Ltd., New Birks Bldg., Montreal.



No. I Mitchell Screen.



No. 5 Mitchell Screen.

EDITORIAL

THE ANNUAL MEETING, C. I. M. & M.

The best yet, is the Annual Meeting of our miners and metallurgists now being concluded in Ottawa. There were evidently those who had doubts about the suitability of Ottawa for the meeting, as shown by the special facilities advertised beforehand, and emphasized by Mayor Plant, for short inter-provincial excursions. Actually, there has not been any general interest in these excursions, and the members have paid more than the usual attention to the business and technical sessions.

A tone of confidence and optimism has pervaded the meeting. Dr. Corless' presidential address gave the cue for what followed. This remarkably able exposition of the limitations and possibilities of our chief natural resources, and of the predominant part the miner must play in Canada's development, disproved conclusively his first remark that "it is a wide subject — so wide that there may be nothing in it!"

Dr. Corless' demonstration of the potential importance of our mining industry, and his plea for an adequate national policy bore fruit immediately. The meeting endorsed unanimously the Secretary's "forward" policy as regards membership, and likewise instructed council to carry out the full programme of printing brought up for discussion. There is no doubt that the liberal policy as regards membership in the Institute is in accord with both its tradition and the attitude of its present members, and that the powers now put in the hands of the council will not be abused through the election of members unworthy of the honour. There are many Canadians deeply interested in the development and operation of our mineral resources who up to the present have not had the warm welcome they deserve from the Institute. It was aptly pointed out at these meetings by a number of speakers that the capitalist, the business manager and the investor in mines are essential factors in mineral development. These men have yet to be adequately represented in our Institute. The present meeting may mark the change.

Rather more uncertain and less clear-cut is the Institute's financial policy. It is a "forward" policy, too; but whether there will go forward a debit or a credit remains to be seen. The discussion and the resolutions adopted showed a complete confidence in the ability of council and our secretary to make ends meet. It may be that this confidence rests upon the fact that "we have now a real, live secretary, and we hope to have a real, live council." We hope it rests upon definite plans formulated by the secretary and approved by the late council. No such plans were made public at the meeting; but this might properly be the case with a speculative or tentative programme. In the meantime, the buoyancy of a meeting that has given "carte blanche" to its executive in the way of expenditure might reasonably be called in question by those capable of acting as ballast in the Institute ship. There are sure to be head winds during the coming year; but we hope the skipper and crew will have sufficient skill to beat safely to port.

The technical papers have been of a high order, worthy of the Institute's annual meeting. The contentious subjects that are so apt to consume time, and that amuse a few and bore the rest, have been studiously avoided. Also, highly technical subjects have been subordinated to those of general interest and national importance, the numerous meetings of branches having provided a more suitable outlet for specialized information and its discussion.

Particularly commendable is the attitude of co-operation with progressive thought outside the Institute, evidenced by Dr. Shortt's return visit to the annual meeting, and by Captain Carter's expert advice on aeronautical questions. If the Institute is to play its part as a national force, it must co-ordinate itself with

the other factors in national progress. Here is tangible evidence that the Institute's leaders recognize the necessity and the expediency of such co-operation.

An important question that was not formally discussed, but was alluded to in sufficiently conclusive way, is the attitude of the Institute as a body toward restrictive legislation for engineers. Whatever may be the individual tendencies of members on the question of a trade union for engineers, it is quite clear that the Institute will not itself become exclusive, as it is intended to make the proposed corporation. The mining engineer performs a function that engineers in other branches are seldom called upon to do. It is he that must locate, develop and make immediately useful to humanity the natural resources upon which progress mainly depends. Most other engineers build upon the result of his efforts, and have functions that are capable of clear definition. The miner's functions are as diversified and as difficult of pre-determination as the ore-bodies he finds and develops. Herein lies the difference between him and his brother engineers. Here also, is the source of his pride, and his peculiar usefulness to civilization.

THE STRENGTH OF UNITED EFFORT.

In concluding his comments on operations at the Hollinger mine during the past year, Mr. A. F. Brigham said: "I take great pleasure in referring, in terms of highest appreciation, to the services rendered by the staff, although perhaps the most eloquent testimony is borne by the result of the year's work." The economical mining and treatment of over a million tons of gold ore demands the attention of a large number of skilled men. In each of the several phases of mining and milling operations many thousands of dollars are expended and each of the numerous operations is important. Under the head of mining come cross cutting, drifting, raising, sinking shafts, timbering shafts, stoping, scaling, timbering stopes and raises, backfilling, track laying, tramming, electric haulage, pipefitting, drainage, hoisting, landing and dumping, drill repairs, sharpening steel, distributing steel, mine sampling, lighting, excavation, surveying and assaying. In milling there is a similarly long list of operations: crushing, conveying, classification, tube-milling, concentration, treating concentrates, handling and thickening pulp, cyaniding, agitation, decantation, filtration, neutralizing, clarifying, precipitating, refining, sampling and assaying. Then there are a number of important items classed as general charges, including a variety of things from clearing surface and building roads to marketing the bullion. In order that the steady stream of gold may be maintained all these parts of the business must function, and in order that the whole operation may be carried on advantageously each department must be operated efficiently. There are many men who contribute to the successful operation of the mine. Many engineers, and a multitude of others, contribute their quota to the sum-total of accomplishment reported on by Mr. Brigham. The individual efforts are known to few, but the total results indicates that the big machine is working well in all its parts.

BACK TO THE LAND—AND THE BUSH.

Canada is much interessted in the "back to the land" movement. This interest is "altruistic" in the case of many Canadians, for it means that *the other fellow* is to go back to the deserted farm, or hew out a new one on the frontier. However, the idea is fundamentally sound. Though the product of one farmer's efforts is now many times what it was even a few years ago, due to the mechanical aids that multiply his capacity, still the continuous drift from country to city, accentuated during the war-time, has left us in a state of un-balance.

There is a moral in this for the mining profession, and now is the time to point it, when our rivers, lakes and mountains are about to wake from their annual sleep, ready to receive to their bosoms the sleek canoe and the sleepy burro. To understand the present necessity for pointing a moral, one needs but study Mr. Corless' Presidential address in Ottawa this week.

Hard times have driven many a man back to the old farm already, and more will go. There, food and shelter at least can be had, and a competence unless conditions are awry. Many engineers, not excluding mining engineers, have felt the pinch. Where can they go? Why, back to the bush of course!

As the farmer supplies the chief means of subsistence for the whole community, so do the prospector and the man who does initial development care for the continuance of the mining industry. A recent correspondent of the Journal argues, in pessimistic vein, that we are using up ore faster than we are finding it. A correspondent today points out the vast possibilities of our territories. We wish to point out that it is only the efforts of the prospector that can justify the optimistic view and dispel the gloom of the pessimist.

The farmer is the back-bone of our whole community. So the prospector is to the mining community. prospecting is attracting more and more, highly trainable as farming, and similarly fundamental. Both "hay-seeds" and "bush-whackers" suffer the gibes of ignorant scoffers. The prospector particularly excites the risibility and often the derision of men in more settled occupations who consider themselves much more important in the cosmic organization. But the self-important ones are wrong. Without the prospector they would revert to pegged shoes and ox-carts, and would have to farm or starve. Also, the field for prospecting is, attracting more and more, highly trained men, and the old-time prospector finds it expedient to train himself similarly in order to hold his own.

What about the investment, the works itself and the reward? It costs ridiculously little to provide for the legitimate expenses of a prospector in the field. The work of preliminary development, up to the point at

which the technical representatives of capital can safely be called in, is likewise far from costly in most cases; in fact that main investment is usually the energy behind a pick and shovel, and the power behind a hand drill.

The field for the prospector extends from the International boundary to the uttermost parts. We have pointed out lately that some parts of Canada long settled offer district opportunities. Not all trained mining engineers are versed in wood-craft; but most can find their way round partly settled regions, and so can locate a field for prospecting suited to their training.

The prospector's reward cannot be definitely gauged beforehand, and even the results in general must remain a matter of opinion. Our experience leads to the belief that, if he is at all adapted to the work, and if he applies himself discreetly and consistently, the reward of the trained prospector or mining engineer is as sure as most things are in this uncertain world. Instances could be quoted and multiplied to prove this; but the statement will suffice.

Thus there is offered to the adventurous engineer, as well as to the man willing to "take a flyer" much sounder than is to be had on the stock markets, a chance to forward his own interests, along with that of the country. Initiative, courage and a small amount of money are the pre-requisites. We can safely assume that where the first two are present, the third will be found.

MAPPING OF QUEBEC.

In a paper presented at the Ottawa meeting of the Institute of Mining and Metallurgy, Mr. A. O. Dufresne gives some account of recent progress in prospecting in Quebec. Considering that Ontario's great silver and gold producing areas are but a few miles west of the Quebec boundary, and that there are large areas in Quebec of rock formations similar to those of the Ontario mineral areas, it is to be expected that Northern Quebec may some day rival its neighbor as a mineral producer. As yet Quebec's output is chiefly from the Eastern Townships.

In the early days of prospecting at Cobalt, it was generally held that the Ontario mining laws were more favorable to the prospector than were those of Quebec. The present Quebec mining law is favorable to the prospector and enables him to secure title to property at moderate cost. Prospectors will to well to pay more attention to Northern Quebec.

The geological mapping of Northern Quebec is proceeding only slowly. The Province might well spend larger sums in learning more about its mineral resources. Prospectors should have something to guide them in their search, and Government maps and reports not only serve as guides but stimulate interest. There are, now available geological maps of parts of Northern Quebec, but the Province is in large part still unmapped.

EDITORIAL NOTES.

"Silver" Process for Gold Ores.

The treatment of gold ores containing carbonaceous matter has received much attention lately in Northern Ontario because of the occurence of gold ore in carbonaceous schists. The black rocks have been encountered at the McIntyre and Hollinger mines. Owing to the action of carbon on the cyanide, the gold occuring in such rocks is not easily recovered and much ore of this character has been left unmined pending the devising of suitable methods for treatment. Some time ago it was announced that a suitable method had been worked out at the McIntyre mine and would be used in the new plant to be built this year.

The Merrill Company of San Francisco, now announces that it has taken over the rights to the "Silver" process, named after Mr. Silver, metallurgist of the Tonopah Belmont Development Company, who discovered it. By a simple pre-treatment of the ore with an inexpensive reagent, the carbon is rendered inert and the ore may by cyanided with normal extraction and cyanide consumption.

This carbon problem has been attacked by many metallurgists and there can be little doubt that the researches consequent upon the occurrence of such ore in California and the Gold Coast will be of value at Porcupine. It would be interesting to have some account of these researches from some of those that have been recently engaged on the problem.

ANNUAL MEETINGS.

Time was when, from the East and West,
We gathered near the Ides of March
And did our utter, eager best
To see that no one felt a parch.

Years pass and jealous tempus flies;
Manners and morals suffer change,
Man may improve, but pleasure dies
If Puritans can so arrange.

* * *

Thus thinking, I adjourned to Hull
And there acquired a quart of Mull

Anon.

PORT ARTHUR NOTES.

By J. J. O'Connor

Mr. George Glendenning, of Toronto, made an examination of the McKellar Longworth, Jackson Development Company, Vimy Ridge and Pommaker Company's gold properties in the Schreiber district, in the interests of New York and Toronto parties, during the past two weeks, and left for Toronto today.

Negotiations are under way between the various interests involved, whereby it is intended that the above properties will be combined under one company and operated under one management. If this merger is consummated, it is the intention of the proposed purchasers to undertake an aggressive campaign of development on all the properties concerned. It is understood that they are now in negotiation with the Hydro-Electric Power Commission, with a view to having the necessary power delivered to the properties from the Nepigon hydro development.

The Canadian Institute of Mining And Metallurgy

Twenty-fourth Annual Meeting.

It is rather a hopeless task to attempt to compress into a few brief paragraphs proceedings so compendious and so well worth careful attention as those of the meetings now being concluded in Ottawa. If such an outline will help to stimulate a study of the papers themselves, it will have served a useful purpose.

Mineral Statistics.

The first item was, as usual, the consideration of mineral statistics. Mr. Cook's report from the Dominion Bureau of Statistics followed the same general lines as the reports formerly issued by the Department of Mines, as recommended by the Institute last year. A decided forward step is the co-operation of Provincial and Dominion authorities in the collection of statistics from operators, with the object of avoiding the useless labour involved in a duplication of returns. Mr. Gibson at this meeting formally turned over to Mr. W. R. Rogers the responsibility of presenting Ontario's statistics in future. Mr. Denis gave his report for Quebec as usual. British Columbia was represented by Mr. J. D. Mackenzie of Vancouver.

To offset the general reduction of mineral output during 1921, there are a few compensating features. The success of the Trail smelter in the treatment of Sullivan ore is of outstanding importance. The fact of the Mond Nickel Company's continued operation points to the soundness of a diversified production; Italian vineyards still need copper sulphate, and platinum jewelry is still the vogue. More and more, conditions favour the mining of gold, and Ontario's production is going up by leap and bounds. Coal production in Nova Scotia is now on a sounder basis than it has been for some years.

The Presidential Address.

Dr. Corless chose for the topic of his Presidential Address the question that is always of the utmost consequence to the mining fraternity, but seldom has the attention its importance warrants. The usual description of Canada's potential mineral wealth is adjectival and that only. Dr. Corless has not stinted the adjectives, but he describes as well the facts of nature that inspire his confidence. "Illimitable mineral resources" corresponds logically with a half-continent of mineral-bearing rocks, only a corner of which has as yet had even preliminary exploration, and of this corner, only a small fraction has been thoroughly prospected. The nickel field offers a case in point. Its posibilities will not be exhausted until many times the present amount of exploration has been done. It is obvious, when once it has been pointed out, that Canada's fifteen per cent. of agricultural land cannot lead eventually to agriculture as our chief industry. The pre-Cambrian shield and the ore-bearing mountain ranges East and West have pre-determined our main national occupation. We need the help of Dr. Corless' broad outlook to keep these things before us.

Dr. Shortt's Paper.

Dr. Shortt's exposition of "The Economic Relations of Canadian Gold Production" showed clearly the reason for facts observed by all and understood by few. The discussion that followed demonstrated mainly how indiscreet it is for a layman to question the conclusions of a learned economist. Particularly startling was it to find that in abnormal times like this a gold reserve performs a function that is mainly psychological, its proper function (that of balancing international difference of trade) having ceased when the load of difference became too heavy for it to bear. The present loss that the United States is subject to on account of its huge holdings of gold was aptly illustrated by Dr. Shortt's remark that we might as well build another transcontinental railway and let it lie as to keep the equivalent gold in our vaults, so far as the real value of either is concerned. The relative indestructibility of credit he demonstrated by pointing out that "the gold of Britain has melted away, whereas her credit is still good."

Two interesting predictions were made by Dr. Shortt; first, that within a few years gold will, relatively, be worth more than $20.67 an ounce; second, that when the gold of the United States is finally distributed throughout the world, it will be through the hands of British bankers, and with profit to Britishers.

The Mining Industy and Our Railways.

Dr. Camsell gave specific information about railways and the minerals they carry, where ordinarily only conclusions and generalisations are available. "In the United States one freight car out of every three carries coal; but excluding coal the mining industry in that country furnished in 1919 twice as much tonnage as agriculture, three times as much as forestry, and twelve times as much as the animal industry." In Canada we have not yet reached that proportion; but with only a fraction of the arable land of the United States and potentialy many times her capacity for mineral production, we will do well to lay more stress upon the relation between railways and minerals that Dr. Camsell discusses.

Mr. Price-Green of the Canadian National Railways pointed out in discussing the paper that a substantial beginning had already been made in educating possible investors to the mineral possibilities along the National lines.

Gold.

As is natural and logical, gold loomed large in this year's programme. Accomplished facts were represented in the compendious and lucid accounts of operations at the Hollinger and McIntyre mines. As records of sound and progressive engineering, and as a guide to those responsible for similar development in the future, these papers deserve a prominent place in the Institute's transactions.

Of interest in a different way and to a wider public is Mr. Hopkins' paper on "Ontario Gold Deposits." It promises well for the volume now in the press and shortly to be issued by Ontario Department of Mines. This address was made the occasion of a graceful compliment from industrial pioneer to scientist. Mr. Tom Saville, veteran prospector, resolved with unanious approval that the thanks of the Institute be tendered Mr. Hopkins and his brother geologists for the help they have given to the mineral industry in general and to prospectors in particular. One needs travel but a short while with a geologist among his friends the prospectors to know how real is the service and how warm the appreciation.

The forward view in gold mining was provided in Mr. Gordon's estimate of future gold production in Northern Manitoba, and in Dr. Wallace's account of prospecting conditions in the same region. It would

seem that it will require only the consistent and determined efforts of prospector and engineer to make Manitoba fulfil the promise of a youth that is promising indeed.

Of more than the usual interest was Dr. Johnston's description of his investigation of the old Cariboo placer field in British Columbia. The scenes of sixty years ago will never be re-enacted at Barkerville; but determining by means of a moderate amount of drilling of almost two million dollars of recoverable gold must imply renewed activity in the famous gulches.

Precious Metals at Sudbury.

Mr. Peek's resumé of the occurrence and recovery of gold, silver, platinum and palladium in the nickel ores of Sudbury gave the result of some experimental work done under his own direction, as well as the gist of what has been already published on the subject. His last remark, that the production of metals of the platinum-palladium group is commercially hazardous owing to the caprices of fashions in jewelry and the fact of actual and possible substitutes in the arts, presents a warning that is sound and not apt to occur to the average observer.

Ball Mills, and Drop Shafts.

Prof. Haultain's paper on "Ball Paths in Tube Mills" and Mr. A. A. MacKay's on "Drop Shaft Sinking" were the most highly technical presented at the meeting. The first gives the results of one of that multitude of painstaking researches that gives us, in the aggregate, the whole of our scientific knowledge. The second records an achievement in practical engineering that makes for the progress of the practical art.

The Newest Feldspar Quarry.

Ottawa is not commonly known as a centre of mining activity, but it is rapidly becoming so. Mr. N. B. Davis' paper describing the Derry quarry, north of Buckingham, Quebec, makes known to the general mining public the fact that Canada has now a worthy successor (or possibly partner) to the famous Richardson feldspar quarry. Mr. Davis omitted mention of the fact that he is himself responsible for locating this unique deposit, and that it is the result of a consistent and arduous search that he had conducted among the hills of Ontario and Quebec for many weary months.

Geologising by Seaplane.

The "canoe" geologist has been superseded. Seaplane is the latest style. Dr. E. L. Bruce's account of the actual results he got from aerial observation during the course of his experience of last summer in Northwestern Ontario is definite and conclusive. He has not merely pictured the seaplane as an aid to pioneer geological and topographic mapping; he has demonstrated it. It is to be hoped, as will as expected, that the co-operation begun by Dr. Bruce and Captain Carter will be extended through a long series of geological reconnaissances in our unmapped regions.

The moving pictures given at various times during the meetings were a blessing. It it notoriously more difficult to follow an argument by ear than by eye. The pictures provided relaxation, as well as a real source of information.

Institute Policy.

Last here, but the most prominent among the considerations before the Institute at this meeting, was the Secretary's programme for the coming year, and the policy he has formulated. After showing clearly the Institute's present position with regard to membership and funds, and having demonstrated what the future would bring if the present policy (or lack of policy) were continued, Mr. Mackenzie offered two alternatives. The Institute cannot afford to drift along as at present; either it must become a closed corporation, highly technical and exclusive, aiming to improve the status and remuneration of its members; or it must make itself really representative of the mining industry by including among its members all reputable men directly or indirectly concerned with its operation and progress. A spirited debate followed these proposals. That the Institute is already well along the road the Secretary proposed it should travel was demonstrated by two of the members that supported him. Mr. T. B. Caldwell, for long among the Institute's most active members, is a woollen manufacturer who develops mines as a hobby. Mr. J. P. McGregor is a lawyer who specialises in mining law, and is prominent in Institute affairs.

A most dignified opposition to the measure was presented by Mr. J. D. Mackenzie, representing the British Columbia memebers. He foresaw dangers in extending the membership unduly, and in incurring additional expense through the publication of both monthly bulletin and annual transactions. However, when it came to a vote, the Secretary's policy came through with flying colours, and he gracefully thanked the meeting for their vote of confidence.

The Local Committees.

That the committees in charge of the arrangements in Ottawa had spared no pains to provide for the comfort and convenience of members, was evident on all sides. The official taxi service to the Mint, Parliament Buildings and other local points of interest; the excellent office arrangements; the shepherding of the many small groups of excursionists; the entertainment for ladies; the constant care of visitors—all leave an impression of friendly courtesy that is much to the credit of our Ottawa members.

The two principal excursions, to the refinery of the British America Nickel Corporation at Deschenes, and to the Kingdon lead mine at Galetta, will provide further opportunity for acquaintance with courteous miners and metallurgists. The old days of the tobacco-spitting, loose-tongued, hard-fisted mining man are pretty well gone; his successor may be less interesting as a curiosity, but is a much saner companion and friend.

KINGDON MINE.

The article last week describing the Kingdon Mine and smelter failed to give credit to the late James Robertson for a faith that has been more than justified by the development done under the direction of his son, Mr. Charles M. Robertson, the present head of the James Robertson Company. For forty years the late Mr. Robertson held Chats Island firm in the conviction that his prospect would one day make a mine. Engineer after engineer was retained to examine the outcrop and little development pits, but not till 1911 did all attendant circumstances permit the Kingdon Mine to emerge from embryo.

A correction must be made in last week's account. There it was stated that a large premium had been paid for Kingdon lead for storage batteries. This exaggerated the premium actually paid, though it is true that lead of exceptional quality such as this does command a special market.

The Crowsnest Coal Field

(By our B. C. correspondent.)

Both in the light of the mining experience of the past and in the possibilities of the future, the Crowsnest Pass Coal Field of British Columbia and the coal measures of the districts contiguous to it are of special interest to the coal operator and to all associated with the industry.

The paper read by Robt. Strachan, senior mines inspector for British Columbia, before the Canadian Mining Institute at its recent meeting in Vancouver, was followed with close attention. He described it as the most important coal field on the Pacific slope of the continent, estimated the probable reserve at 38,378 million tons, and said the quality varied from a bituminous to almost an anthracite. Analyses were quoted to show that the coal ranks among the best in the Dominion and that "only two seams of all those tested showed greater heating value, namely, the Phalen and Harbour Seams of Cape Breton."

As to conditions he said: "The nature of the overburden differs greatly with the locality. In some places it consists merely of the surface of timber and a slight covering of coal blossom, while in other places the seams run under the mountains until the cover reaches almost 3,000 feet. The coal is easily reached along the outcrop where it is exposed by the erosion caused by the creeks that traverse the measures, and it can easily be traced along the escarpment on the east side of the Elk river, where the seams can be seen at an elevation of 1,500 to 2,000 feet above the level of the river, dipping into the mountains. Here the great dynamic forces that have caused the upheaval resulting in the formation of the Rocky mountains, have twisted and folded the measures, making the working of the coal seams along this outcrop difficult and dangerous. The points at which mining has been successfully conducted are situated where the creeks have cut through the coal measures, exposing them about three to five miles from the Elk escarpment, at Coal Creek, Michel, Morrissey, Hosmer and Corbin. At the present time collieries at the first two and the last of these localities are working."

The holding of the Crow's Nest Pass Coal Co., it was stated, amount to about 200,000 acres on which there are at present two active collieries, viz., those at Coal Creek and Michel. Considerable detail was given regarding the coal measures being worked. These comprise five seams, ranging in thickness from 5 to 30 and 40 feet. The character and quality of the coal varies, that of No. 1 seam being dark grey in colour and very friable; that of No. 2, bright black in colour and not so friable; and that of "B" seam, which is 5 feet in width, dull grey in colour and inclined to be hard. The Coal Creek coal, it was pointed out, is practically all mined by hand, the percentage extracted by machinery in 1920 amounting to 0.057 p.c. of the total output. Explosives are not used in getting down the coal.

Methods of Mining.

As to the mining methods adopted, Mr. Strachan stated that "some form of the 'Pillar and Stall' method has been adopted in every case. These pillars were generally 30 by 40 feet, while of the stalls, those intended for main roadways were driven 12 feet wide and the remainder 18 feet wide. In the early days, no doubt owing to the irregular contour of the seam, from 25 p.c. to 30 p.c. the pillars in many cases fell short of these dimensions and little attempt was made to extract any of them."

The address continued:

"Several attempts were made to work the No. 2 seam by the longwall method, but these eventually were abandoned for several reasons that combined to render the method too costly, mainly the lack of suitable material for packs, and the great thickness of the seam, which necessitated very heavy cogs.

"At Coal Creek the overburden is at its greatest thickness and partly because of this and partly because of the irregular size of the pillars considerable trouble has been experienced in working the mines on the south side of the creek. This trouble was occasioned by the strata settling down, thereby breaking the supporting timbers and, in the case of No. 2 seam, pushing the pillars into the floor, accompanying which was an outflow of explosive methane gas. In the case of No. 1 seam it caused the sides of the pillars to flow out into the roadways, which in some instances were almost filled. Disturbance of this nature, termed locally a "bump", was very pronounced in 1908, causing the loss of several lives and practically cutting off the greater portion of No. 2 Mine. Profiting by experience, W. R. Wilson, who had just previously been appointed general manager, determined in 1911 when laying out the new No. 1 east mine on the No. 1 seam, to increase the size of all the pillars and to drive his main roadways so that the greatest advantage should be taken of long and solid pillars to assist the ventilation. Following this plan three pairs of parallel levels were driven, having between each level a 50 foot pillar and between each pair a 150-foot pillar. Butt entries were set off every 600 feet so that between each pair of entries there was a pillar 380 by 140 feet, which only provided for the extraction in the first operation of about 19 per cent of the coal. The development of this mine had proceeded for more than five years and the output of coal had reached over 1,500 tons per day, when another disturbance, similar to those experienced during 1908 in the No. 2 mine occured, cutting off the greater part of the mine. This disturbance occurred in the main level district, about 4,000 feet from the mine entrance, and almost exactly over or above the ground where the trouble was encountered in No. 2 mine. The existence of the old workings may have been a contributing cause, but the principal cause no doubt was the great weight of the strata overhead, accompanied by possible weakness in the strata. Above this coal seam the mountain attains a height of over 2500 feet, which under normal conditions represents a weight of 187 tons per square foot; but the conditions here are far from normal, the coal seams being entirely unsupported on the north side, while deep gashes sides leave it practically like a lever supported at on end."

Further precautionary measures were then determined upon, the speaker asserted, it being decided that "all future work should provide for still larger pillars. These were to be increased from 150 to 200 feet, thereby reducing the percentage of coal obtained during the first operation from 19 p.c. to about 12 p.c. In other mines this system is modified to suit local requirements, the size of the pillars being increased

Gas And Ventilation.

After giving an account of the methods of mining and shipping the coal Mr. Strachan gave some interesting figures illustrative of the amount of gas given off in the various mines and the ventilation provided to meet underground conditions. The table showed the amount of air provided per unit per minute (a unit representing each man or boy while each horse or mule was estimated as three units), the amount of methane produced per ton of coal mined and the amount of methane given off every twenty-four hours, as follows:

Mine	Amount of air circulated per minute for each unit.	Methane produced per ton of coal mined.	Methane given off in 24 hrs.
	cu. ft.	cu. ft.	cu. ft.
No. 1 East	1,000	6,192	2,476,800
No. 3	624	2,697	868,320
No. 2	476	1,360	345,600
No. B. North	552	3,086	610,560
No. 1 North	331	1,867	672,480
No. 1 South	268	384	102,240
No. 9	460	.....	82,080
Total			5,158,080

It was noted that in the mines with the greatest production of methane the greatest amount of air per unit is provided and that "the new fan, which has been built for the most gaseous mine, No. 1 East, will almost double th present amount of air per unit."

Dust Prevention.

Concerning coal dust dangers it was stated that roadways, sides, roof and floor are treated with water, piped for the purpose when it cannot be obtained locally. When it can be obtained locally it is kept under pressure by means of a pump, driven by compressed air, and the water is used with a hose to wash down the roadways and also the working face. In some portions of the main roadway sprays are arranged to blow off at every 100 yards all night and in this manner the moisture permeates every portion of the roadway. In addition the dust and second burnt ashes are in use as a preventative to the propagation of an explosion. Within the past four years all oil-burning lamps (except those required by the officials, not exceeding twenty) have been eliminated from the mine in favour of the Edison electric safety lamp. Gas tests are made not only with the safety lamp but as well with the Burrell gas detector at least once in every eight hours in every mine. Records are made of these readings and a diagram kept in the manager's office shows the daily percentage of the methane given off, the barometric pressure, the amount of air passing at such times as it is measured, and the result of the analysis of the air samples taken.

Michel Colliery.

A similarly complete and interesting description was given of the Michel Colliery, opened in 1899, and situated about 17 miles north of Fernie, and 8 miles west of the summit of the Rocky Mountains. Michel Creek has cut across the coal measures leaving them exposed on either side and the seams, of which seven are enumerated, have a thickness ranging from 5 1-2 feet to 10, 12 and 14 feet. Three mines are working, two on the No. 3 upper seam and the third, No. 8, on the No. 8 seam. The coal of the former is of a brilliant dark colour and of firm texture while that of the latter is a dull grey colour. Mining methods are like those at Coal Creek, simplified through lack of "bump" trouble, the reasons being comparative lightness of cover and the greater solidity of the formation. Explosives are used at Michel to a limited extent for the blasting down of coal, and the proportion of machine-mined coal is greater than at Coal Creek although not more than 4.3 p.c. of the total output.

The amount of gas given off and the ventilation provided are detailed in the following table:

Mine.	Amount of air circulated per minute for each unit.	Methane produced per ton of coal mined.	Methane given off every 24 hours.
	cu. ft.	cu. ft.	cu. ft.
No. 8	271	211	95,040
No. 3 East	1,090	6,096	1,828,800
No. 3	551	1,732	606,240
Total			2,530,080

To dilute this amount of dangerous gas, 254,822,400 cubic feet of air is circulated every twenty four hours, and the methane percentages average just under one per cent. Similar measures to those applied at Coal Creek are used to deal with the coal dust problem, men being detailed in every mine to keep the roof, floor, sides and working face free from dust.

Huge Veins at Corbin.

An interesting account was given of the Corbin Coal & Coke Company's operations, whose holdings of about 20,000 acres, are situated about 20 miles due east of Fernie. The locality is known as Coal Mountain and the seams are almost vertical and attain great thicknesses. "This latter feature appears to be due", it was stated "to monoclinal folding of the measures, so that in a horizontal section of 2,604 feet we have 811 feet of coal. The whole of the mountain has not yet been prospected and although over a million tons of coal have been extracted since the colliery was opened, this represents no more than a scratch on the surface."

A rather novel method of mining the coal was described as consisting of "stripping off the timber, then washing away the surface of coal blossom, and loading the coal directly into railway cars with a steam shovel. But owing to complaints of the pollution of the streams this method had to be abandoned and steam shovels were then used for stripping the overburden, which was loaded into dump cars, removed some distance from the workings and dumped."

It was affirmed that "the mining of the coal by the stripping method did not prove as economical as might have been expected, the amount of coal lost being considerable", and in opening another seam the caving system was practised. In this system the pillars are first formed and then split into small portions when owing to the weight either of the surrounding ground or of the seam itself the coal runs of its own accord. In the event of the coal failing to run however, either one of the existing cross cuts is used or a new one is driven to the point and a blast set off. Owing to the friable nature of the coal here no trouble was experienced unless timber that had not been withdrawn caused a stoppage. In this manner practically the whole series of pillars can be drawn until all the coal is extracted, but unless the roof of the [illegible] of a tender nature and follows up the coal, trouble is likely to be experienced with the huge cavities left behind."

In the development of a new mine another method, somewhat similar to that in use in Michigan iron mines, is to be adopted. The seam being laid off in panels, raises are driven up until the side of the panel is reached and the pillars will then be extracted in lifts. A solid floor of timber will be laid down under the tracks and this will act as the roof for the next lift, and so on.

The liability of these large seams of coal to taking fire, it was explained, had retarded their development, No. 1 seam being on fire and the upper portion of No. 4 seam burning. The latter mine has so far been saved through the vigorous efforts of officials.

The coal is described as being black and glossy in appearance, possessing a greater ratio of free carbon and less of volatile matter than the coal either of Michel or Coal Creek and as having a higher percentage of ash than the coals of those localities.

British Columbia Letter

Prince Rupert Coalfield.

The construction of a forty-five mile railroad to open up a coal field in the Morice River Region, northern British Columbia, is being asked of the Dominion Government by a deputation of residents of Prince Rupert and the districts adjacent. Such transportation facilities, according to a statement made by the Prince Rupert Coalfields Ltd., would tap a proven reserve of 54,000,000 tons of high grade bituminous coal. Diamond drilling, it is stated, has established that there are three seams on the property, measuring 4.5, 5.5 and 7.5 feet respectively. The railway also would give the operators of the Betty Mine connection with the Grand Trunk Pacific Railroad. Thus the project would assure a continuous supply of fuel to Prince Rupert and users throughout the north country. Not only this, but it would make possible the development of a substantial bunker trade at the port of Prince Rupert. It is argued that, with the unquestionable wealth of this part of British Columbia in respect of coal, those whose businesses and whose homes are there should not be dependent on coal imported from Vancouver Island and the Province of Alberta.

Chu Chua Coal.

When Professor W. L. Uglow, of the Canadian Geological Survey, gave his geological description of the Chu Chua coal deposits before members of the Canadian Mining Institute assembled in Vancouver, he raised a storm that threatened to become turbulent, but shortly subsided and died harmlessly away. The professor gave the analysis of a number of samples of Chu Chua coal that were not flattering, the ash content being rather high. This coal basin, it may be explained, is situated in the North Thompson Valley, and a comparatively short distance from the town of Kamloops. John Cunliffe questioned the propriety of the delivery of such an address before the Institute, deprecated the professor's alleged statement that the property was not likely to prove a commercial success, and said that he had inspected it and found substantial evidences of large quantities of coal. Prof. Uglow replied that he had inspected the property at the request of the director of the Canadian Geological Survey, and that no malice was intended in his remarks, which were almost entirely with reference to the geology of the field, answering further he said that he had not sampled a "seam of dirt" but a seam of coal and that he had been, in person, in the mine.

Notes on Coal Flotation.

P. E. Peterson read a short paper entitled "Notes on Coal Flotation" at the Canadian Mining Institute's recent meeting in Vancouver. He explained that he had carried on some experimental work to test the suitability of the flotation process for the cleaning of Vancouver Island coals, that samples had been taken from the product of the Douglas seam for this purpose, and that for laboratory experiments a Janney flotation test machine was used, larger tests being made with a Peterson cell, eight feet six inches in diameter, having an approximate capacity of fifty tons per twenty-four hours. "The results," he declared, "show that, on the material tested, good recoveries of clean coal can be made by the use of the process."

OUTPUT OF COAL FOR MONTH OF JANUARY, 1922.

Vancouver Island District.

Mine	Tons.	
Western Fuel Corporation of Canada, Ltd., Nanaimo	58,183	
Canadian Collieries (D) Ltd.,		
Comox	26,554	
Extension	18,477	
South Wellington	6,619	
Granby Cons. MS & P Co. Cassidy	26,166	
Nanoose Wellington Collieries, Wellington	8,477	
Old Wellington (King & Foster)	553	
TOTAL	145,029	145,029

Nicola-Princeton District.

Middlesboro Collieries, Middlesboro	6,123	
Fleming Coal Co., Merritt	3,323	
Coalmont Collieries, Coalmont	10,014	
Princeton Coal & Land Co., Princeton	1,921	
TOTAL	21,381	21,381

Crow's Nest Pass District.

Crow's Nest Pass Coal Co.,		
Coal Creek	35,945	
Michel	23,892	
Corbin Coal and Coke Co.,	4,899	
TOTAL	64,736	64,736
		231,146

WHERE THE MONEY GOES.

The Hollinger report shows that in 1921 the cost of mining was $2.98 per ton, milling $1.46 per ton and general charges 42 cents per ton. There was paid for labor in the three departments, $1,979,817, $500,891 and $228,924 and for stores $1,215,026, $1,067,292 and $120,739. The employees received during the year a total of $2,709,632 and those who supplied the stores received $2,403,057. There was paid in taxes $429,889. Shareholders received in dividends $3,198,000. There was left to be added to surplus $828,927 which will be used to provide plant for increasing output.

"Hard times" seem to have brought exploration and prospecting to the fore. This illustrates once more the fact that compulsion is the great factor in progress.

Chance Finds

By Reece H. Hague.

When one looks over the notable mineral discoveries of the world it seems remarkable the large part the element of chance has played in the majority of them. Of course there are many cases where finds have been made by prospectors after a long and weary search, but a big percentage of strikes have been stumbled upon more or less by accident.

Greenhorns have been responsible for some of the most important discoveries made, and in numerous cases they have been unaware of the richness of their finds until enlightened by some sophisticated prospector or mining man. Experienced prospectors sometimes run across the mine of their dreams when least expecting it, and it is astonishing how many finds have been made by prospectors putting ashore for lunch or when held up from travel by the elements.

Northern Manitoba has been no exception in the matter of mineral finds having been made by chance and one could quote many instances of luck which has led to men running across promising mineral deposits.

Last summer a prospector named Gaspard Richard made a discovery in the Snow Lake region near Herb Lake, and a number of prospectors hastened to the spot to stake, impressed with the samples Richard displayed. Having put up their location posts, the prospectors were camped on the eve of their departure on a bank near the lake. When they retired for the night fresh logs were on the fire blazing near the tents. To the consternation of all it was discovered in the morning; that during the night a large log had rolled from the fre to the lake shore and burned the end of one of the canoes that were tied there. The charred end was removed and the canoe patched up as well as was possible with the limited means at the disposal of the men, but it was decided that it was not strong enough to carry its full quota of passengers. Consequently two of the men were elected to walk the several miles through the bush to the Herb Lake camp, one of those chosen being Jacob Cook, an Indian prospector employed by J. P. Gordon.

Cook and his companion were proceeding back to Elbow Lake when the former noticed considerable oxidization in an outcropping and stopped to investigate. Panning disclosed a good tail of gold.

Cook made all haste to acquaint Mr. Gordon of his discovery. When he arrived at Herb Lake and told his story a number of men immediately left for the spot described by Cook and several promising veins were located and staked, free gold being found in places.

Jacob Cook was the man that discovered the Red Rose mine at Copper Lake for Mr. Gordon, some two and a half years ago. Samples from this property aroused considerable interest in the mining world when they were brought in by Cook, as they were richer than anything that had previously been taken out of the district.

That Cook's luck occasionally deserted him however, was shown by the fact that he, among other prospectors, had frequently camped on the spot at Elbow Lake where the Muray Brothers made their sensational find last Spring. The water was at the time the Murray brothers stopped at this point for lunch, very low and enabled them to see big splashes of free gold at the water's edge. They subsequently traced the enrichment for some distance inland.

The Flin Flon mine, which diamond drilling sinking and drifting have proved to contain more than 16,000,000 tons of mixed sulphide ore, was discovered by prospectors paddling a canoe on Flin Flon lake, who saw the sulphides glistening under the surface of the water and thereby were enabled to locate the ore body.

The Mandy Mine, from which in the neighbourhood of $2,000,000 worth of high grade copper has already been taken, and which still contains $12,000,000 worth of low grade ore, was found by two prospectors that had picked the site where the mine now stands as a suitable place to put in for lunch, and were highly elated when they found they were sitting eating bacon and bannock on rock of great value.

Two years ago the wife of a man employed cutting cordwood for a mine at Herb Lake wandered away into the bush one morning and in her ramblings ran across a vein of quartz carrying free gold. She arrived back at her shack highly elated and with clothing torn from contact with the shrubs. Men went back with her to the scene of the discovery and staked the ground.

One could go on almost indefinitely describing the peculiar incidents connected with the discovery of mines. Time and again a prospector has stumbled across a mineral deposit of untold wealth on a spot which had previously been traversed by hundreds of people oblivious to the richess beneath their feet.

How many prospectors have spent their whole lives seeking the elusive mineral, and died in poverty, having never made a single strike of importance, while a greenhorn on his first expedition covering the same ground as the dead man has made a find that has yielded him a fortune? It is very true that in prospecting luck does not always come to the most deserving. Some strikes have been made by prospectors after many weary months of conscientious search, but many of the world's richest mines have been found accidentally by comparative greenhorns.

How many prospectors have staked properties and after doing a little work abandoned them, to have them picked up a little later by someone else, who after doing a trifle more exploration work, has uncovered a veritable Bonanza? But these things are all in the game. The unfortunate prospector gives a grunt of disgust when he learns that he has slipped up on a winner, shoulders his pack, and, pick in hand, starts out on another trip of discovery, always hoping that the next journey will reward him for all his years of toil, and always confident that he will some day find the pot of gold that lies at the foot of the rainbow.

The Merrill Company of San Francisco has issued a bulletin on "Merco" processes and products. In this are presented descriptions of apparatus used at many gold mines. The Merrill Clarifying Filter, Crowe vacuum apparatus, Merrill filter press, Merco-Nagle stream plug valves and merillite are described.

Nothern Ontario Letter

THE GOLD MINES.

The public at large has at last appeared to realize the importance of developments at the gold mines of Northern Ontario. Right on the eve of probable dividend increases on the shares of the leading producers, a wave of speculation and investment has set in which has caused the market value of the operating companies to advance possibly ten million dollars as compared with two months ago.

An event for which thousands of people have been waiting is the mailing of the annual statement of the Hollinger Consolidated covering operations during the past year. Also, the ending of the fiscal year of the Dome Mines on March 31st is looked forward to with extreme interest. Stockholders of record on or before the end of March will participate in the capital repayment of $1 per share that is to be made on April 20th, together with the regular dividend of 2½ p. c. The double payment, will amount to $1.25 on each share and will result in the distribution of approximately $595,000.

While the public show signs of clamoring for shares that they believe may rise to much higher quotations on the open markets, the operations at the mines continue at full capacity and with general preparations for further enlargement of mills and broadening scope of underground operations. It is already obvious that the aggregate output for the current year will exceed by a large margain any former record in the history of gold mining in Ontario. Preminminary estimates range from $21,000,000 to $23,000,000 for this year in newly produced gold from the Porcupine and Kirkland Lake fields.

The report in last week's issue of the Canadian Mining Journal that power development at Sturgeon Falls would commence in the early spring and that the work of clearing a transmission line and general preliminary preparations have commenced, has received official confirmation this week. This removes the last obstacle in the way of a full realization of the prosperity that is bound to lie behind such large and rich ore bodies as are already opened up in the Porcupine district.

Dome Mines.

If the record of the past several weeks on the Dome Mines is maintained, this enterprise promises to be one of the sensations of the year in the world of industry. For the time being, the mine has risen from the position of having the largest low-grade gold bodies in Canada to a point where its ore exceeds in richness the Hollinger Consolidated and even the McIntyre-Porcupine. The significance of the achievement will be more fully realized within the next few months, perhaps within the matter of a few weeks.

Longyear Options Claims.

The Longyear firm of contractors are securing options on properties lying to the west and south-west of the Hollinger-McIntyre area. The options usually comprise an agreement to do a certain amount of explorations by use of diamond drills and with an option to buy the properties in whole or in part for $100 per acre within a specified time. The claims secured in this way are covered with sand overburden to depths ranging from 50 to 100 feet. The drilling venture is based upon the theory that the zone of mineralization may be found to continue for some distance on its present strike and has only remained concealed owing to the heavy overburden. It will be remembered that the Longyears carried out a somewhat similar venture with success in the Sudbury district, as well as in Spitzbergen.

The Porcupine V. N. T. as well as the Porcupine Crown are expected to resume operations this spring. There are reports on the street that in view of the Porcupine V. N. T. having only $50,000 in sight with which to carry on work, it would not come as a surprise were some basis of consolidation to be arranged with the Porcupine Crown. In this way, the mill of the Porcupine Crown could be quickly brought into play on ore from the Porcupine V. N. T.

Speculators are turning their attention to such properties as the Newray, Moneta, Inspiration and Preston East Dome. The success of the leading producers of the field has led to a widerspread belief that the purchase of certain of these properties may be only a matter of time.

Hollinger Mill Enlargement.

In regard to the proposed enlargement to the mill on the Hollinger Consolidated, although definite annoumcements have not yet been made, the plan favored is undertsood to be to be to instal ball mills on a super-structure back of the present stamps. In this way, at such times as the ball mill may require repair, the stamps can be temporarily brought into play. The stamps may be discarded altogether, but, if not, by-passes will be provided to convey the crushed ore to the stamps. The question is also being considered of installing rolls ahead of the ball mills so as to further reduce the ore in size before letting it pass into the ball mills.

Wright-Hargreaves.

The annual statement of the Wright-Hargreaves has been issued, and deals with milling operations from May 1st to Dec. 31st. A feature of the statement is that while 36,081 tons of ore went through the mill, this came entirely from development work. Moreover, an additional amount of approximately 25,000 tons in broken ore was placed in reserve. Following is a general summary of the report:—

A net profit of $201,186 is shown by the Wright-Hargreaves Mines, Ltd., for the eight months ending December 31, 1921, in the first annual report of the company, since mining operations were begun, now going forward to shareholders. The report is a most satisfactory one and shows that 3,0681 tons of ore were treated during the period under review, from which they received $468,665, and this ore came almost entirely from development work.

The treasurer's report shows that the company is in good financial shape. The profit and loss statement showed an income of $486,282, of which the big item was bullion production of $468,650. Mining and development cost $127,250, and general expenses totalled $231,000. Current assets showed cash on hand and with bank amounting to $282,972, and bullion in transit $32,836. In the capital assets, mining property is valued at $1,500,000, and plant and equipment at $359,865. An allowance for depreciation on the property and equipment was made of $20,722, and there was also written off the preliminary development cost $32,477, leaving the total assets at $2,425,796. Current liabilities are given as $172,026, of which $137,500 is

for a 5 per cent. dividend, payable January 2, 1922.

Much developement was carried out during the year according to the report of General Manager A. Wende. The first four months of the 1921 season were taken up in preliminary and development work, mainly due to power shortage, and it was not until May 1 that production actually commenced. Work was confined mostly to No. 2 vein with very satisfactory results. During December preparations were made for continuing the No. 3 shaft from the 400 ft. level to the 700-ft. level. Since commencement of milling on May 1 the mill, has run 91.89 per cent. of the possible time, and the average value per ton of the ore treated was $13. The broken ore on hand December 31 amounted to 25,085 tons. The average number of men employed during the period was 103.

Argonaut.

In an official statement to the representative of the Canadian Mining Journal, John W. Morrison, manager of the Argonaut Gold stated that about 75 p. c. of the material required for the new mill at this mine would be on the ground before the snow leaves. The company has its own sawmill in operation and is hauling cement for concrete foundations. By late summer it is expected to be turning out gold bricks. Mr. Morrison also made the announcement that work would commence immediately in connection with continuing the main shaft from the 350-ft. level to a depth of 500 feet. A large tonnage of ore is already in sight and this deeper development is expected to put the mine in a very satisfactory physical condition.

Lake Shore.

During the month of January the Lake Shore mine produced $51,883.30. A feature of the achievement for the month was that 2,335 tons of ore was put through the mill, this being a daily average of 75 tons and comprising the highest tonnage record for this mine. The work of enlarging the main shaft was under way during the period. It has been learned that an electric hoist will be installed during the second quarter of this year which will be sufficiently powerful to carry operations to a depth of 1,000 feet. The question of enlarging the mill to perhaps double or three times its present capacity will not be taken up for the present.

King-Kirkland.

The machinery for the King Kirkland Gold Mines is being transported to the property over the snow roads and this property will be operated in an aggressive way during the coming summer. The outlook for the enterprise is exceptionally good

Teck-Hughes.

Work of deepening the shaft on the Teck Hughes has commenced. The work will be carried from the 600-ft. to a depth of 980 feet and will make this the deepest mine in the Kirkland Lake field for the time being. As to this, however, it is interesting to learn that the Kirkland Lake Mining Company is considering the question of extending its underground workings to 1,000 and possibly 1,200 feet in depth.

Bidgood.

A special meeting of the Bidgood Gold Mines has been called for March 1st. Among other things the question of increasing the number of directors will be considered. The balance sheet shows cash and accounts receivable of $18,059.11, against which are accounts payable and outstanding cheques of $23,039.15. The stock remaining in the treasury at the end of the year was 326,615 shares. In addition to this, the statement contains the somewhat unique announcement that 158,500 shares have been contributed by certain stockholders to further strengthen the treasury. To date $113,313,82 has been spent on the property A total of 1,077 feet of underground work has been done.

THE SILVER MINES.

At a depth of 600 feet on the Violet property of the La Rose, a substantial quantity of good milling ore is being opened up. The indications appear to be that the La Rose will enjoy another prosperous year.

The Mining Corporation is defending an action which has been brought against it by the La Rose in which the latter company is endeavoring to collect money for the value of silver contained in tailings which resulted from the treatment of its ores some years ago by the Cobalt Reduction Company and which was later taken over by the Mining Corporation.

Coniagas.

Within the next month, the Coniagas will commence the exploration of the old Ruby property in Bucke township. A diamond drill will be used to test the formations as well as to explore for veins. It is understood that the Coniagas also secured options on two other properties.

Mining Corporation.

The reports about the Mining Corporation having taken the option on the Forneri property in South Lorrain are erroneous, although it is understood the Corporation, in addition to working the Haileybury Frontier has become interested in the Haileybury Silver.

McKinley-Darragh.

Reports reaching Cobalt this week have it that the McKinley Darragh has optioned property in Northern Manitoba, although the point is not made clear whether the option is for property in The Pas or at Elbow Lake.

Tesmiskaming.

Bids are being made to the Tesmiskaming Mining Company for lease on certain sections of the underground workings. This question was previously considered by the Tesmiskaming but was held in abeyance owing to some favorable developments having been encountered about that time. In view of the improved economic situation since the mine was closed down, it is believed the property could be worked profitably under existing conditions on company account. In spite of this, the plan to grant leases is believed to be worthy of careful consideration.

Colonial.

The local press prints a report that the old Colonial mine, situated adjacent to the O'Brien has been sold to New York interests. No details as to the terms of the reported deal have been secured up to the time of writing. The Colonial is recognized as one of the more promising of the undeveloped properties in the Cobalt field

PRICES OF PORTLAND CEMENT IN 1921

Preliminary estimates made by the United States Geological Survey from reports of representative producers of portland cement show that the average factory price per barrel of portland cement, excluding cost of container, in the United States in 1921 was approximately $1.87.

The average net factory price received per barrel for the whole country in 1920, as shown by reports received from all producers was $2.02

Canadian Copper Possibilites

By ALEXANDER GRAY.

Although there is no rush about it (to avail of a familiar expression) it might be as well for those who give precedence to precious metal propositions, to bear in mind that Canadian potentialities in copper are a long way from being negligible. The immediate future particularly of undeveloped properties, may not evoke much interest and activity, but there is encouragement in the remarks of Mr. Parke Channing to the effect that "there will be a copper famine in fifteen years unless new, large deposits are found".

The popular impression has been that existing porphyries, South American producers, and those of Granby and Howe Sound, in British Columbia as well as of Alaska, suffice for the world's needs for longer than Mr Channing foresees. Chile and Utah, the largest in point of known ore reserves, were regarded as more continuous sources of the red metal, even when the mines of Arizona and Nevada shall have been dismantled. Anaconda, with its South American subsidiaries, was supposed to be immune from exhaustion for more years than Mr Channing suggests. However, he is not an engineer and executive who indulges in extravagant statements, and the very fact that he publicly admitted the likehood of a copper shortage so soon, leaves it for Canada to prepare for eventualities, notwithstanding the nonchalant view entertained by some, that a substitute for copper will be found should the necessity arise. Perhaps what may happen fifteen years hence is of less immediate moment than what has been accomplished since Jackling and his contemporaries took the cue from the late James Douglas and others in the treatment of copper ores. Without the porphyries and modern smelter practice, copper would be a semi-precious metal in price. Were it not for flotation as perfected by John Ballot and associates, the acute stage in copper would be present. That 1½ and 2 per cent. ores became economically profitable, gave a filip to production beyond the ken of pioneer metal masters when Hamilton Smith was guide, philosopher and friend to the Rothschilds in copper matters, and Rio Tinto and Butte were supposed to be the elastic limit of expectations. Matte went to Swansea because London was the metal market. Douglas, the Guggenheims, Clark, and others, including Jackling, took the leadership away from Boston and its Calumet & Hecla millionaires. Ballot and his Minerals Separation in co-operation with electrolytic practice minimized losses in recovery and thereby postponed the critical period to which Mr. Channing directs attention.

Singularly enough, it was at a Canadian copper mine, the Britannia, that the first practical test was made of the oil flotation process. Flotation admittedly is indispensable. Its added saving of copper content and consequent increase in production and profits, supports the belief that the last word has not been written about the limit of payability. Simplified treatment and low mining costs put off the evil day as fixed by the vice-president of the Miami company. Meanwhile, there is accumulating testimony that Canada is going to have large copper mines, more of its own smelters and refineries and have Canadian-made copper products.

To the Nickel-Copper Industry, is to be accredited the erection of nickel and copper refineries. The Consolidated Mining & Smelting Company have rounded out their metallurgical works at Trail. At Anyox, the Granby company are giving a demonstration deserving of more than passing mention. With a grade of ore comparable with the generality of porphyry coppers, a pruned payroll and an efficient plant, the rate of copper production in recent months has been greater than the company reported for 1920. Shipments averaging 2,5000,000 lbs. of copper per month, the precious metal output, and by-products from coke ovens and metallurgical departments, bespeak more than has been expressed by the capable management. In 1920, the Granby company mined and smelted 802,-067 tons of copper ore, containing 7615 ozs. gold, 381,-742 ozs. silver, and 25,404, 950 lbs, of copper. The Hidden Creek property, therefore, began to take precedence in the province, the Britannia mine production being adversely influenced by metal markets and a series of mishaps continuing until a month or two ago. Granby carried off the honors, although broader markets and more working capital will be welcomed.

Meanwhile, promising prospects indicate the certainty of British Columbia becoming a producer of copper on a larger scale. The Consolidated Mining & Smelting Company no doubt will take advantage of easier money markets to do substantial financing on behalf of the Sullivan Mine, West Kootenay power, the Rossland properties, and those Vancouver Island copper areas that have been accumulated in the past few years. Owing to the price of copper and high freight rates, the Canada Copper Corporation cannot operate. Apart from that, the Consolidated Mining & Smelting Company have the very comprehensive plans indicated in the annual report for 1920, as follows:

> "The increase in Property Account during the year is $799,912.82. The increase includes the purchase of additional stock in the West Kootenay Power & Light Company, Ltd.; the purchase of bonds of the Coast Copper Company, Ltd, the purchase of stock and of bonds to finance development of the Sunloch Mines, Ltd.; payments on properties under bond; and expenditures on trunk line development at Kimberley and Rossland."

The metallurgy of the Coast and Sunloch ores has received attention. Sooner or later they will be served by a mill on the spot, and thereby obviate the needless cost of hauling raw ores long distances, as has been done at Kimberley. What is expected of the Consolidated copper areas, was briefly referred to by President Warren in his last annual report, in this way:

> "Further development of the Sunloch and Coast Copper properties has been suspended until the Copper market improves. These properties promise to provide a very large tonnage of copper ore high enough in grade for profitable results under normal conditions and metal prices".

Evidently these are "discoveries" within the meaning of Mr. Parke Channing's portentous remarks. Taking Mr. Warren's statement as its worth—that the tonnage offering is "very large",—there is the further judgment of Mr. S. J. Schofield, than whom in the premises there is no higher authority:

> "The Britannia sills and the Britannia formation, which may be considered as a unit, since they were affected by the same geological processes, are surrounded and underlain at some depth by granodio-

The Canadian Miners' Buying Directory.

Acetylene Gas:
Canada Carbide Company, Ltd.
Prest-O-Lite Co. of Canada, Ltd.

Acetylene Welding:
The Toronto Iron Works, Ltd.

A.C. Units:
Powley & Townsley, Limited.

Agitators:
The Dorr Co.
Can. Chicago Bridge & Iron Co., Ltd.
Horton Steel Works, Limited.

Air Compressors:
Belliss & Morcom, Ltd.
Laurie & Lamb
Sullivan Machinery.

Air Hoists:
Canadian Ingersoll-Rand Co., Ltd.
Mussens, Limited.

Air Receivers:
The Toronto Iron Works, Ltd.

Alloy and Carbon Tool Steel:
Peacock Brothers Limited.

Alternators:
MacGovern & Co.

Aluminium:
Spielman Agencies, Itegd.

Amalgamators:
Northern Canada Supply Co.
Mine and Smelter Supply Co.
Wabi Iron Works.

Antimony:
Canada Metal Co.

Antimonial Lead:
Pennsylvania Smelting Co.

Assayers' and Chemists' Supplies:
Dominion Engineering & Inspection Co.
Lymans, Limited
Mine & Smelter Supply Co.
Pennsylvania Smelting Co.
Stanley, W. F. & Co., Ltd.

Ash Conveyors:
Canadian Link-Belt Company

Ashes Handling Machinery:
Canadian Link-Belt Co., Ltd.

Assayers and Chemists:
Milton L. Hersey Co., Ltd.
Campbell & Deyell
Ledoux & Co.
Thos. Heyn & Son
C. L. Constant Co.

Asbestos:
Everitt & Co.

Balls:
Hull Iron & Steel Foundries, Ltd.
Peacock Brothers Limited.
The Wabi Iron Works.
The Hardinge Conical Mill Co.
The William Kennedy & Sons, Ltd.

Ball Mills:
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd.
Mine & Smelter Supply.
The Wabi Iron Works.

Babbit Metals:
Canada Metal Co.
Hoyt Metal Co.

Ball Mill Feeders:
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd.
Mine & Smelter Supply.

Ball Mill Linings:
Hardinge Conical Mill Co.
The William Kennedy & Sons, Ltd.
Peacock Brothers, Limited
Hull Iron & Steel Foundries, Ltd.
Mine & Smelter Supply.

Balances — Assay & Analytical:
Mine & Smelter Supply.
The William Kennedy & Sons, Ltd.

Belting—Leather, Rubber and Cotton:
Canadian Link-Belt Co., Ltd.
Northern Canada Supply Co.
Jones & Glasco.

Belting:
R. T. Gilman & Co.
Gutta Percha & Rubber, Ltd.

Belting—Silent Chain:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal.
Jones & Glassco (Regd.)

Belting (Transmission):
Goodyear Tire & Rubber Co.

Belting (Elevator):
Goodyear Tire & Rubber Co.

Belting (Conveyor):
Goodyear Tire & Rubber Co.
Gutta Percha & Rubber, Ltd.

Bins and Hoppers:
The Toronto Iron Works, Ltd.
Can. Chicago Bridge & Iron Co., Ltd.
Horton Steel Works, Limited.

Blasting Batteries and Supplies:
Canadian Ingersoll-Rand Co., Ltd.
Mussens, Ltd.
Canadian Explosives, Ltd.
Powley & Townsley, Limited.

Bluestone:
The Consolidated Mining & Smelting Co.
The Coniagas Reduction Co., Ltd.

Blowers:
Canadian Fairbanks-Morse Co., Ltd.
Northern Canada Supply Co.

Boilers:
Canadian Ingersoll-Rand Co., Ltd.
Marsh Engineering Works
R. T. Gilman & Co.
The John Inglis Company
Wabi Iron Works.
The William Kennedy & Sons, Ltd.

Blue Vitriol (Coniagas Red):
Canadian Fairbanks-Morse Co., Ltd.

Bortz and Carbons:
Diamond Drill Carbon Co.

Boxes, Cable Junction:
Standard Underground Cable Co. of Canada, Ltd.
Northern Electric Co., Ltd.

Brazilian Rough Diamonds:
Diamond Drill Carbon Co.

Brazilian Mica:
Diamond Drill Carbon Co.

Buggies, Mine Car (Steel)
Hendrick Manufacturing Co.

Brazilian Ballas:
Diamond Drill Carbon Co.

Brazilian Rock Crystal:
Diamond Drill Carbon Co.

Brazilian Tourmalines:
Diamond Drill Carbon Co.

Brazilian Aquamarines:
Diamond Drill Carbon Co.

Bridges—Man Trolley and Rope Operated—Material Handling:
Canadian Mead-Morrison Co., Limited

Bronze, Manganese, Perforated and Plain:
Hendrick Manufacturing Co.

Buckets:
Canadian Ingersoll-Rand Co., Ltd.
R. T. Gilman & Co.
Hendrick Manufacturing Co.
Canadian Link-Belt Co., Ltd.
Marsh Engineering Works
Mussens, Ltd.
MacKinnon Steel Co., Ltd.
Northern Canada Supply Co.
The Wabi Iron Works
The William Kennedy & Sons, Ltd.

Buckets, Elevator:
Canadian Link-Belt Co., Ltd.
Hendrick Mfg. Co.
Peacock Brothers Limited
The William Kennedy & Sons, Ltd.

Cable—Aerial and Underground:
Canada Wire & Cable Co.
Northern Canada Supply Co.
Standard Underground Cable Co. of Canada, Ltd.
Peacock Brothers, Limited

Cableways:
Canadian Mead-Morrison Co., Limited
Fraser & Chalmers of Canada, Ltd.
Mussens, Ltd.
The Wabi Iron Works
R. T. Gilman & Co.

Cages:
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Northern Canada Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Mine & Smelter Supply Co.
Mussens, Ltd.
The Wabi Iron Works
The William Kennedy & Sons, Ltd.

nevertheless, in view of Mr. Campbell's position and reputation I am apprehensive that his article, particularrite of the Coast Range batholith. This great batholith extends from the International Boundary-line on the south in a north-westerly direction to Alaska. The main mass holds many inclusions of all sizes which are termed roof pendants or roof remnants and are more or less mineralized".

The absense of outcrops is noted in many instances, "only by persistent prospecting and faith", Mr. Schofield writes, have the economic worth of certain sections been disclosed. Mineralization so extensive, he points out, offers a field for enterprise. Money conditions will govern the extent of explorations; but in due course the Messrs Guggenheim, the Granby interests, and the Consolidated Mining & Smelting Company, will enter upon further capital expenditure. It is significant of the Consolidated Mining programme that more copper areas have been acquired. The company's annual report does not so specify. The 1920 annual report of the British Columbia Minister of Mines does dwell upon developments in the Sunloch Group, and says "prospecting carried on during the past season resulted in the staking of seven additional mineral claims, so that the Sunloch Mines Company, Limited, now owns thirty claims and fractions having an area of aproximately 1,300 acres. The development-work during 1920 consisted of 1,802 feet of diamond drilling and 995 feet of cross-cutting and drifting, making the total work done on the Sunloch Group of claims 3,470.-5 feet of diamond drilling and 3776.3 feet of crosscutting and drifting. Diamond-drilling demonstrated the downward continuation of the ore in that zone (the west side of the River Jordan) to a depth of 150 feet below the mine workings".

Construing that along with the comment of Mr. Warren as to the presence of a "very large tonnage of copper ore high enough in grade", there should be more conclusive information forthcoming one of these days. A mill there, another at the Sullivan Mine, and Rossland supplying ore in greater quantities, confirms the impression that the Trail metallurgical works will become more and more of a manufacturing center, specializing in copper, zinc and maybe brass products.

East from Portland Canal, through the Skeena and Omineca districts; over into northern Alberta and Manitoba, eventually will respond to better transportation facilities. While the Flin Flon occurrence may be somewhat of an isolated one, it is not a rash assumption that there are others. The Mandy Mine prompted prospectors who located the Flin Flon and its $140,000,000 or $150,000,000 worth of metals in combination. That and the Rice, Herb and Beaver lakes country gave prospectors the urge to find more, hence the Elbow Lake discoveries and their spectacular features. In the Murray properties at Elbow lake there appears to be a real basis for a movement. Outcropping conditions at adjacent properties indicate the enrichments are not localized at the Murray ground. At all events, the rigors of Winter in that latitude are not deterring the adventurous from staking rather than await open weather. Responsible mining engineers qualifiedly vouch for the possibilities of the sections. So to Flin Flon copper-gold contents is added this latest field tending to inspire optimism.

The Canadian West has had only "forty winks" since the Rossland boom and is refreshed. Developments are invigorating and the capital necessary would rather come to Canada than go elsewhere—all things being equal.

MINING QUOTATIONS.

Quotations on Active Stocks on Standard Stock Exchange, Toronto, for week ending Feb. 28th, 1922.

Silver	High	Low	Last
Adanac Silver Mines, Ltd	1¼	1⅛	1¼
Bailey	2¾	2⅜	2¾
Beaver Consolidated	36	24½	35½
Chambers-Ferland	3¼	3¼	3¼
Crown Reserve	24	15¾	24
Gifford	1½	¾	1⅛
La Rose	53	38	53
McKin.-Dar.-Savage	19	18½	19
Mining Corp. of Can.	115	110	115
Nipissing	675	625	670
Ophir	2¼	5	5½
Silver Leaf	1¼	1	1¼
Temisgaming	36	32	34
Trethewey	5½	4	5½
Gold.			
Apex	3½	2	2¼
Atlas	19½	17	19½
Argonaut Gold	38	38	38
Dome Lake	9	7	9
Dome Mines	2600	2455	2600
Gold Reef	4	3¼	4
Hattie Gold M. Ltd.	23	19¾	23
Hollinger Cons.	925	850	925
Hunton Kirkl'd G.M.	9	6¾	9
Keora	14¼	10	14
Kirkland Lake	49	35¼	46
Lake Shore M. Ltd	180	152	175
	Par $5.00		
McIntyre	1555	266	1555
Moneta	14¾	10¾	14¼
Newray Mines Mines, Ltd.	10	9	10
Porcupine Crown	27	19	26
Porcupine imperial	⅞	½	⅞
Porcupine V.N.T.	28½	24	28
Preston East Dome	7¼	5¾	6¾
Schumacher	50	36	48½
Keora	31½	23	31½
Teck-Hughes	43	30	43
Thompson Krist	5¼	4½	5
West Dome	9⅛	7¾	9¾
West Tree Mines Ltd	4	3½	4
Wasapika Gold M. Ltd	4	5½	4
Wright-Hargeaves	185	185	185
Miscellaneous			
Petrol Oil The	19	17	19
Vacuum	2½	2½	2½

CORRESPONDENCE.

The Editor.—

Sir.—In your issue of Feby. 3rd you print a letter from Mr. G. M. Campbell anent misrepresentation of our mineral resources, and in the same issue is an editorial, partially explanatory and wholly defensive.

I have, in my lengthy experience, been called many names but no one has yet considered me an optimist;

Canadian Miners' Buying Directory.—(Continued)

Cables—Wire:
Standard Underground Cable Co of Canada, Ltd
Canada Wire & Cable Co.
R. T. Gilman & Co.

Cable Railway Systems:
Canada Wire & Cable Co.

Cam Shafts:
Hull Iron & Steel Foundries, Ltd.
Peacock Brothers Limited.
The William Kennedy & Sons, Ltd.

Car Dumps:
Sullivan Machinery Co.
R. T Gilman & Co.

Carbids of Calcium:
Canada Carbide Company, Ltd.

Cars:
John J. Gartshore
MacKinnon Steel Co., Ltd.
Northern Canada Supply Co.
Marsh Engineering Works
Peacock Brothers, Limited
Mussens, Limited
Powley & Townsley, Limited.
R. T. Gilman & Co.
The William Kennedy & Sons, Ltd.

Car Wheels and Axles:
Canadian Car Foundry Co., Ltd.
Burnett & Crampton
Hull Iron & Steel Foundries, Ltd
John J. Gartshore
Marsh Engineering Works, Ltd.
Peacock Brothers Limited.
The William Kennedy & Sons, Ltd.

Carriers (Gravity):
Jones & Glassco

Castings—Brass
The Canada Metal Co., Ltd.

Castings (Iron and Steel)
Hull Iron & Steel Foundries, Ltd
Peacock Brothers Limited.
The William Kennedy & Sons, Ltd.

Cement Machinery:
Hadfields, Limited
Hull Iron & Steel Foundries, Ltd.
Burnett & Crampton
The William Kennedy & Sons, Ltd.

Chains:
Jones & Glassco
Northern Canada Supply Co.
Canadian Fairbanks-Morse Co., Ltd
Canadian Link-Belt Co., Ltd.
Greening, B., Wire Co., Ltd.

Chain Drives:
Jones & Glassco (Regd.)

Chain Drives—Silent and Steel Roller:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal, Que
Jones & Glassco) Regd.).

Chemical Apparatus:
Powley & Townsley, Limited.

Chemists:
Canadian Laboratories
Campbell & Deyell
Thos. Heyes & Sons
Milton Hersey Co.
Ledoux & Co.
Constant, C. L. Company

Chrome Ore:
The Electric Steel & Metals Co.
Everett & Co.

Classifiers:
Mussens, Limited
Fraser & Chalmers of Canada, Ltd
The Wabi Iron Works
R. T. Gilman & Co.
The Dorr Company

Clutches:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal, Que

Coal:
Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutters:
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd
Peacock Brothers, Limited

Coal Crushers:
Canadian Mead-Morrison Co., Limited
Canadian Link-Belt Co., Ltd.
Peacock Brothers Limited.

Coal Mining Explosives:
Canadian Explosives, Ltd
Giant Powder Company of Canada, Ltd

Coal Mining Machinery:
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd
Canadian Ingersoll-Rand Co., Ltd
Sullivan Machinery Co.
Marsh Engineering Works
Hadfields, Ltd.
Hendrick Mfg. Co.
Powley & Townsley, Limited.
Mussens, Limited

Coal and Coke Handling Machinery
Canadian Link-Belt Co., Ltd.
Powley & Townsley, Limited.

Coal Pick Machines:
Sullivan Machinery Co.

Coal Screening Plants:
Canadian Link-Belt Co., Ltd.

Cobalt Oxide:
Conlagas Reduction Co
Everitt & Co.

Compressors—Air:
Smart-Turner Machine Co.
Canadian Ingersoll-Rand Co., Ltd
Mussens, Limited
Peacock Brothers, Limited

Concrete Mixers:
Gould, Shapley & Muir Co., Ltd
MacGovern & Co., Inc
Mussens, Limited

Condensers:
Smart-Turner Machine Co.
Northern Canada Supply Co
Bellhs & Morcom, Ltd.
Laurie & Lamb
Peacock Brothers, Limited

Concentrating Tables:
The Mine & Smelter Supply Co
Deister Concentrator Co

Converters:
Northern Canada Supply Co
MacGovern & Co., Inc.

Conveyors—McCaslin Gravity Bucket:
Canadian Mead-Morrison Co., Limited

Contractors' Supplies:
Canadian Fairbanks-Morse Co., Ltd

Consulters and Engineers:
Hersey Milton Co., Ltd.

Conveyors:
Canadian Link-Belt Co., Ltd.
Jones & Glassco (Regd.)
Powley & Townsley, Limited.

Conveyor Belts:
Gutta Percha & Rubber, Ltd

Conveyor Flights:
Canadian Link-Belt Co., Ltd
Hendrick Mfg. Co., Ltd

Conveyor—Trough—Belt:
Canadian Link-Belt Co., Ltd
Hendrick Mfg. Co.
Mussens, Limited
Jones & Glassco (Roller, Belt and Chain)
Hendrick Mfg. Co.

Conical Mills:
Hardinge Conical Mill Co

Copper:
The Canada Metal Co. Ltd
Consolidated Mining & Smelting Co

Couplings:
Hans Renold of Canada, Limited, Montreal, Que

Cranes:
Canadian Mead-Morrison Co., Limited
Canadian Link-Belt Company
Peacock Brothers, Limited
R. T. Gilman & Co.
Smart-Turner Machine Co

Crane Ropes:
Allan Whyte & Co.
Canada Wire & Cable Co
Greening, B., Wire Co., Ltd
Peacock Brothers, Limited

Crucibles:
The Mine & Smelter Supply Co

Crusher Balls:
Canada Foundries & Forgings, Ltd.
Hull Iron & Steel Foundries, Limited, Hull, Que
Osborn, Sam'l (Canada) Limited
Peacock Brothers, Limited
Swedish Steel & Importing Co., Ltd
The William Kennedy & Sons, Ltd.

Crushers:
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd
Hardinge Conical Mill Co.
Lymans, Ltd.
Mussens Limited
Osborn, Sam'l (Canada) Limited
The Electric Steel & Metals Co., Ltd.
R. T Gilman & Co.

ly his concluding paragraphs, may be construed abroad as representing truly the position of the Dominion in respect to its mineral resources. Solely with that thought in my mind I have yielded to the temptation to support your editorial views rather than to endorse Mr. Campbell's policy of seeing things just as they are".

To claim at the present day any equality of mineral resources with the well-developed Republic to the south of our boundary is absurd, and purely hypothetical. We are all of us from Missouri—we have to be shown; but to assert that our mineral resources are only just beginning to be discovered, that their development is in its infancy, and that our potentialities are daily increasing, is only to state the facts, in other words the **truth.**

In a paper that I had the honor to present before the Toronto meeting of the American Association for the Advancement of Science I showed that the products of the Mining Industry (apart from the products of quarries, oil wells etc.) had grown from a value of $18,000,000 in 1870 to $228,000,000 in 1920, that is in 50 years; and that Canada as a producer of ores and minerals was only about 30 or 35 years old. If our production has increased nearly 1300 per cent in the past 50 years, during which time transportation has been new, difficult and expensive and most of our country practically unknown, it is reasonable to infer that the next 50 years will show an increase which, if not equal to the past 50 years will nevertheless be extremely satisfactory.

Comparisons are usually odious, because to compare **truly**, conditions must be identical. As yet, and for many years to come, conditions in the United States and Canada are anything but identical, and ratios will be unreliable if not misleading. But on the principle that roses grown on a quarter acre may be as sweet as those grown on a quarter section we should not decry our Canadian resources.

Mr. Campbell sounds a true note in advocating a conservative optimism, and in regarding the language often used by promoters (and others) as "particularly harmful"; he has the feeling of every conscientious engineer who deprecates optimism that exceeds good judgment, that becomes untrustworthy through totally unwarranted predictions; but such an attitude must be receptive of both facts and possibilities, and the writer is one who does not believe that the possibilities of Canada can be definitely measured by the yard-stick of development during the past 40 years.

The ordinary adjective descriptive of size is purely comparative, and often depends upon the blood pressure of the writer or talker, so that Mr. Campbell's objection to "huge," "illimitable", etc. etc. is well taken. But it is not necessary to have a Rio Tinto, or a Homestake, a Mount Morgan, or a Calumet and Hecla, at every doorstep to become an optimist as to the future of Canada's mineral wealth. And, if Mr. Campbell will pardon me, it is decidedly fallacious to say a thing will never happen because it has **not yet** happened.

If Mr. Campbell is right when he prints: "There has not been one solitary discovery of ore of outstanding importance in B. C. during a quarter of a century," does the failure of discovery in B. C. militate against or overbalance the remarkable discoveries that have been made in Ontario in the last 17 years? Can any of us safely make any predictions as to what may be found in the great pre-Cambrian "shield" that covers so many thousands of square miles in the very centre of our Dominion? Clearly none of us can. In 1900 the fame of Ontario as a mineral country was based solely on the nickel ores of the Sudbury region; on what is it based today? The answer is—the very large values obtainable in gold and silver found in the then wilderness of Northern Ontario.

The writer is fortunate enough to have had a very considerable and extensive acquaintance with the whole Dominion during the past 25 years; he is not, and never has been, a pessimist though often called that, and he is rash enough, or wise enough (time only will tell which) to differ from Mr. Campbell; he believes that Canada's present output of metallic wealth will be many times increased during the next quarter of a century.

While it may be true that "it does not take long to go over the outcrops in a district" and locate the large outcrops, it is equally true that it takes a very considerable length of time to **find the districts,** particularly in such inaccessible country as Canada's central basin.

There are many "outcrops" of valuable copper, gold and lead-zinc veins or deposits from the Straits of Belle Isle to Lake Winnipeg of which the writer has personal knowledge. Time, transportation and population are needed before these regions can be definitely added to positive mineral regions. No one can at present truthfully say what such regions may produce in mineral wealth. Therefore a healthy optimism should not be deprecated, rather should it be endorsed.

Yours, etc.

John E. Hardman.

Montreal, Feb. 25, 1922.

The Journal and Its Readers.

In the issue of February 10th there is an article with the above heading which is an appeal to the readers of the Journal to send ideas for discussion. The article makes it clear that it is difficult to carry out the present undertaking and we are asked to "syndicate even prejudices".

As you ask for prejudices you shall have them. It has always appeared to the writer that it was ill-advised to attempt a weekly publication, it must cause anxiety with each issue to find the material and lead to the dilution of the material available in order to spread it out and fill so many columns. Moreover it does not allow time to correct the mistakes in printing which appear at times and are very annoying to the careful reader.

The weekly issue seems to be due to listening to the propaganda of the pestilential Ad Club, as if a thing could be made valuable or desirable by copious writing and advertising. We know that the things which are intrinsically valuable and which people really want do not require advertising; no one spends money to advertise gold bullion or wheat, nor would it be necessary to advertise good liquor if one had it and could legally sell it. My suggestion is that the Journal should be issued fortnightly or 26 issues in the year—one for every letter of the alphabet, and call them A. B. C. etc.

This is a humble suggestion of your faithful reader who will sign himself under the name of the animal which is the example of patient, silent, intelligent industry.—

The Beaver.

EDITORIAL

DRILLING THE PORCUPINE SAND PLAINS.

Systematic exploration of areas near the producing mines at Porcupine has hitherto been largely confined to places where outcrops occur. The heavily covered rocks are now to be explored by diamond drilling. Some such work has already been done; but according to recent announcements, work of this character is now to be pushed vigorously.

The gold discoveries that have resulted in the establishment of a mining industry at Porcupine were made in rock outcrops that narrowly escaped being covered by the glacial mud and sand which has become known as the Northern Ontario clay belt. These outcrops represent the hilltops of the rocky surface that the glacial deposits have so largely hidden from view. The lower parts of the rock surface are so well covered that even in the immediate vicinity of the Hollinger there are areas still unexplored. Here a thick bed of sand hides the rocks from view and makes ordinary surface prospecting impossible. It is not to be wondered at that an attempt is being made to determine what underlies the sand plain west of the Hollinger.

The method of attack is by the diamond drill. The cores brought up will reveal many secrets. The preliminary holes will show the character of the rock formations, and comparison with the rocks that enclose the known gold deposits will give hints as to where the chances for more intensive exploration are most worth while. It is quite probable that there are good ore bodies under the sand, and it is to be hoped that they will be found. The finding of a few ore bodies similar to those of the Hollinger would reward the drillers, and would be hailed with delight by the mining community. The nature of the venture and the cost of drilling will necessitate risking a considerable sum of money. The regular prospector will recognize in those that engage in this drilling enterprise men of kindred spirit.

HOLLINGER RESERVES.

The annual report of the Hollinger Consolidated Gold Mines has, as usual, met with general commendation, as is deserved by such a frank and full statement. Such regard for the truth, and the whole truth is not yet characteristic of the annual statements of mining companies, particularly of those where the control is held by "insiders." It is well to remember, in the case of the Hollinger, that the larger part of the capital stock is still held by the original owners, the LaRose syndicate, and that it is by their leave and under their direction that the annual statement is made. Thus we may justly be proud of the spirit that animates the directors—all Canadians— of our largest gold mine. They have in full degree the sound progressiveness of the times—a part of our democratic inheritance.

To those accustomed to the hand-to-mouth policy so often necessary in pioneer mining operations, an ore reserve of over four million tons, capable of supplying the present mill for three and one-half years, may seem something only to be dreamed about, and hardly capable of realization. Nor does this figure measure the reserves. The "probable" and "possible" ore usually included in estimates on the basis of deduction rather than on the basis of mining development is rigidly excluded from calculation. The Hollinger management can afford to be conservative in their estimates; they are under the necessity neither of persuading doubting investors, nor of bolstering up the hopes of stock holders.

While the state of the Hollinger's ore reserves is thoroughly satisfactory, it induces certain reflections. Mr Brigham states that to maintain the present reserves for further development will keep $1,750,000 tied up continuously. This represents the difference between the cost of exploration and development by diamond drill and actual mining, and the value of the gold recovered from these operations. To this must be added

the cost of breaking the stoped ore held in reserve. This sum, always invested in development works, is 17 per cent. of the annual gross income, and 34 per cent of the nett income. In the case of the Hollinger, these percentages are fortunately low; if nett profits were not so large a proportion of gross income, the interest charge on this item of capital investment would be reflected noticeably in dividends. In other words, the investment in development is a much more serious charge on the income of a low-grade than of a high-grade mine.

There are gradually being delimited in Canada large bodies of low-grade ore. A few of these are now being worked; most of them are still substantially as Nature has presented them to us. Any means that will serve to prove at less cost than at present, the value of the deposits in advance of actual mining work, will be an aid to opening up these deposits. The diamond drill has done much in this regard but its usefulness is limited. Let us be on the "qui vive" for similar and more effective means toward the same end.

Lately we commented on the Dome's policy of gradually reducing the capital stock, in accordance with the using up of the mine's supply of gold. The Hollinger has adopted a different means to the same end. Instead of repaying the capital stock to share-holders, it is being held in trust, as interest-bearing securities. The result of the two schemes, so far as it concerns stock-holders of long standing, should be the same. To those that invest temporarily, or merely speculate, the difference may be more marked. On the surface it seems as if the simple and direct expedient of reducing the capital stock would bring more clearly to the attention of the average investor the fact of dwindling ore-bodies. It will take the combined attention of a broker and a psychologist to get to the bottom of the matter.

BLUE SKY LAWS AND MINING.

In an article published in the "Financial Post" the effect of blue sky legislation on development of mineral deposits is discussed. The writer takes as an example the case of the Hollinger property. He recalls that before the present owners developed it, Senator M. J. O'Brien had an option on it and gave it up after testing it with the aid of diamond drills. Later the Timmins syndicate secured the property and developed it into a great mine. The writer of the article points out that there was here, as in all cases, difference of opinion as to whether development would prove profitable. No one can with certainly estimate the value of an undeveloped or partially developed property.

The writer of the article evidently believes that blue sky laws are unpractical so far as the development of mines is concerned. He questions whether there would be a single producing gold mine in Ontario today if blue sky laws had been in force. There are many that hold the same opinion. The intention of those that advocate the laws may be good; but the business of the men that by hard and honest work endeavor to make mines out of prospects is put in jeopardy by others that in their eagerness to devise laws that are, to their view, just, do not hesitate to support legislation that may be dangerous to the future of the mining industry.

Mines are made by men that take risks and by persistent effort turn to useful account ore deposits that appear to them to be promising. Their opinions vary with their experience and are variously regarded by others. The determinable facts can be ascertained by a competent sampler; but the indeterminate facts are in the case of a prospect of quite as much importance as those that can be determined. Consequently opinions based on experience are a prominent factor in mining enterprises. The value of a mining property cannot be determined until it is worked out. Every day's work brings out new facts.

MONEY FOR MINING OPERATIONS.

An interesting item in the week's news is the announcement that a block of treasury shares of McIntyre-Porcupine Mines Ltd., has been sold for about one million dollars. This money goes into the treasury of the company and is available for expansion of the company's business. It will facilitate the enlargement of the company's plant and will thus materially help in the growth of the mining industry at Porcupine.

The money received for this block of shares goes into the mining business. The company does not need the money to carry on operations on the present scale and therefore is now in a position to get ahead quickly with plans for larger operations. A sale of shares of this character is of vastly more importance to the industry than is the sale of private shares.

Interesting from a different standpoint is the great increase in trading in gold stocks on the mining exchanges. The daily transactions have been recently very large, and the prices of many gold stocks are now much higher than they were a few weeks ago, and much higher than a year ago. This we interpret to mean that a large number of people believe that the outlook for our gold mines is brighter than it has ever been. Trading in shares in such volume is evidence of interest t othe traders, it has an influence on the industry, just as affairs of the industry have an influence on trading. The trading does not put money into the industry as does the sale of McIntyre's treasury shares; but it directs attention to the gold-mining industry. Those that inquire into the reason for the increased

activity in trading find that it is belated recognition of the fact that our gold mines are much more valuable than has been generally believed.

EDITORIAL NOTES.

It was recently pointed out by the Hon. Mr. Mills, Minister of Mines for Ontario, that the Provincial government spent considerably more on Northern Ontario last year than was received in revenue from that region. This is as it should be. Rational development can be stimulated only by liberal expenditure, sanely directed

There is encouragement in the fact that, despite depression in other industries, mining in Canada is showing constant signs of vigor. Overseas transactions are becoming more numerous. This leads to the thought that there is needed some positive means of censoring mining "propositions" submitted by Canadians in London and elsewhere. This is quite as much to be desired as are the proposed measures to control Canadian brokers in their local activities. Canada's good name is a precious asset.

GOUDREAU GOLD CAMP

(Special Correspondence.)

In view of the anticipated activity in the Goudreau District this Spring and Summer, it might be interesting to your readers to know something definite about what has been accomplished to date by local and outside interests in preparation for development work.

Nothing much has been published about the new gold district, except some scant notes about the progress being made with development work on the Goudreau Gold Mines properties. There are, however, at least a dozen other companies with considerable money on hand that have taken over large acreages in the district and will spend a large amount of money there just as soon as the snow goes.

On the Goudreau Gold Mines property, three shafts have been sent on the main vein, and at depths of fifty and sixty feet the very rich character of the ore continues. Engineers who have examined the workings recently state that it is one of the richest deposits of gold that they have ever examined, and that the length, strength and general conformation of the veins gives every evidence of depth and permanency. A six-mile power transmission line has been completed from Steep Hill Falls, where a power plant owned by the Algoma Steel Corporation is located, and all the necessary machinery is on the ground, including drills and compressor, and the plant is expected to be in complete working order by March 15.

There have been deals consummated in the new camp and many rumors of deals.

In general, owners have been willing to accept reasonable cash payments on account, and have retained a large interest in the properties on being assured that ample funds would be available through the sale of treasury stock to thoroughly prospect and develop their claims. In a number of cases, the initial cash payments have been substantial amounts, but the point is that the bulk of the money raised is going to be spent by these various new companies in the actual, intensive and thorough exploration and development of the Goudreau district.

Experienced mining men are not in the habit of paying fabulous sums of money for unproved prospects. They are, however, willing and anxious to provide any reasonable amount of money necessary to prove up good-looking prospects, particularly when the prospector or operator is willing to go along with him and share the risk of development. This is about what is happening in the Goudreau district at the present time, and the writer can confidently state that, as soon as the snow clears away, development work in a large and serious way will begin. There will be a rush to the Goudreau district, and undoubtedly during the Summer a number of other discoveries will be made that may equal or rival the now well-known Murphy Foster properties. This is the kind of legitimate mining business that will keep Sault Ste. Marie and the Goudreau camp in good repute.

HAVE YOU?

Have you ever had a pardner in the bush or in the town?
Have you ever had a pal that seen you through
A bird that stuck right by you when you certainly was down,
And wouldn't let you shake him—just hung to you like glue?

He might touch you for a ten-spot; he might swipe your smoking plug;
He might bone you for the last you had to chew;
But he'd do his share of totin' with a cheerful, smilin' mug
On a trip or in a trouble—why, the guy would see you through!

Well, I've found them just so often in the bush and in the mine,
From Thetford west to Rossland in the land I've laboured through;
But I've never yet found any with a sense of "mine" and "thine"!
Now although I hate to ask you—just inform me, sir, have you?

Anon.

INTERNATIONAL NICKEL CO.

The profit and loss statement of the International Co for the nine months ending Dec 31 shows a total income of $361,271, while expenses were $382,002, leaving a deficit of $14,728. There is also $228,266, to be charged against maintenance and shut-down expense, and $395,684 for depreciation and mineral exhaustion. This brings the deficit to $164,678. Dividend on preferred stock amounted to $401,067. This makes a total deficit of $1,042,745 to be subtracted from the surplus, leaving a surplus at Dec 31 of $10,843,139.

J. T. Donald and Co., consulting and chemical engineers, are now installed in their new premises at 40—42 Belmont Street, Montreal, not far from their old building. A host of friends and clients will follow with good wishes the removal of the firm to new and larger premises.

Gold And Copper In Northern Manitoba*

The outstanding event in Northern Manitoba mineral enterprise during the past year was a discovery by Murray Brothers in June last of a quartz porphyry dike containing free gold in quartz stringers of exceeding richness. The find is located at the south end of Elbow Lake near the outlet, and this lake lies about midway in the mineral belt north of The Pas, between its western extremity at the boundary of the Province and the eastern end at Wekusko Lake near the Hudson Bay Railway.

Naturally the first discoveries in this district were made at either end of the belt, those being the most accessible points; the western end being readily reached by water via the Saskatchewan River, and the eastern by the Hudson Bay Railway. However, during the last few years prospectors have penetrated farther inland, mainly by way of Grass River, and a couple of years ago notable discoveries were made at Copper Lake and at the Northern end of Elbow Lake. And now comes this new development. All these discoveries are practically along the well defined water courses, and the country back therefrom still remains a virgin field of great possibilities. The Murray claims have been visited and inspected by wellknown mining men — engineers, geologists and others — and all have come away full of enthusiasm at the prospects; and what is more to the point, have made reports which have resulted in several important deals and the beginnings of actual development work.

A very practical, and perhaps the best evidence of the importance of the discovery and the value of the property, is found in the fact that as a result of a special examination and report by Mr. Samuel Cohen the men that control the Hollinger Mine have taken an option on the claims in question, have paid a considerable amount in cash, and, what is really of greater moment, have undertaken to carry out investigation and development. These people have the essentials for an enterprise of this kind, ability, experience and money, and it is stated on good authority that they intend to prove thoroughly the claims and that they have every confidence in the outcome. Already 35 men are on the ground, erecting camps and doing necessary premilary work. A road has been cut to Mile 55, Hudson Bay Railway, giving a much shorter route into the camp than that hitherto travelled, and large quantities of freight are now being taken in preparatory to extensive summer operations.

As a result of this find and subsequent development, a miniature gold rush has recently been staged, and the whole countryside in the vicinity of the original claims has been staked, much of it in the snow. A number of Montreal financial men have become interested, and there are indications that Montreal proposes to occupy a similar position in respect to this northern mineral field that Toronto has occupied in relation to the Cobalt and Porcupine areas. Montreal men have formed a company, "The Elbow Mines Ltd.," and now own a number of claims "close in" to those belonging to the Hollinger interests. Walter DeKeyser, a New York engineer representing an important English mining company, has recently visited the district and inspected a number of claims. Consequent upon this he has obtained options on or purchased outright several of those, and the indications are that his company intends to become a real factor in development. Numerous other deals have been made or are now pending, the purchasers being in the main either Montreal capitalists or local men.

Copper Lake.

Since the discovery in 1919 of the "Big Dike" at Copper Lake by Gordon's prospectors, much work in the way of development on those and associated claims has been done, and a diamond drill was in operation on the property last year. Earlier reports of "good values in gold" have been borne out by these operations, and it is now announced that drilling will be continued during the coming season and that the outfit hitherto operating will be supplemented by one or two additional drills. This is an immense property, and with fair values in gold and a little silver should make a good producer.

Herb Lake.

At Wekusko or Herb Lake is the real pioneer gold camp of the north. The discovery of gold in 1914 on the Kiski-Wekusko claims was followed in that and succeeding years by numerous other discoveries, and there are now at this point several well-known properties in various stages of development. The Rex, Moosehorn, Bingo, Elizabeth, Syndicate and Apex are only some of these. The Rex is undoubtedly the premier property in the matter of development. From this mine $33,800 in real gold has been taken. A shaft has been sunk 270 feet and there is nearly 400 feet of drifting at the 100 and 200 feet levels. A 30 ton Lane mill with full equipment is erected on the property, and at the clean-up of all the ore taken out of the mine, realized in bullion $18.00 per ton exclusive of tailings and concentrates.

The Bingo Mine.

Nearby is the Bingo, on which a shaft has been sunk to the depth of 160 feet. Some of the ore taken out has been put through the Rex mill and realized a handsome return. A thorough examination of this property was made last year by a well-known geologist, and in his report he states that 82 samples from the vein give $145.15 per ton for width of 11.65 inches. Seventeen additional samples indicate additional values of $66.68 per ton in width of 19.5 inches.

Other promising claims, such as the Moosehorn and Syndicate (the former of which is already in the producing class), could then be worked to advantage, and their product taken care of by the Rex mill. Conditions therefore give reason for great hopefulness that mining activity at Herb Lake will be resumed in the spring on a much increased scale. This camp is easily accessible. The south end of the lake is connected with Mile 82, Hudson Bay Railway, by a provincial highway 11 miles in length.

Flin Flon and Mandy.

In the Pas Mineral Belt are found a diversity of minerals; two, however, predominate. In the eastern part the discoveries hitherto have been almost exclusively gold, while in the boundary district at the west, copper is prominent. The discoveries have been mainly along the shores of Lakes Athapapuskow, Schist and Flin Flon. Much has already been written regarding

* From a memorandum issued by the Commissioner of Northern Manitoba, The Pas.

the super high grade chalcopyrite of the Mandy and the tremendous orebody of the Flin Flon, but these camps, so recently the scene of mining activity, are now silent. The situation in many respects is similar to that at Herb Lake but the reason for inactivity is far different. The gold properties of the eastern end require capital as a condition precedent to active production, but with Flin Flon and Mandy it is otherwise; capital is available, but at present, owing to the exceedingly low price of copper, a fraction over 13 cents, production would not be profitable.

A year ago the mining fraternity were on the "qui vive" to know whether or not the Thompson interests were going to take up the Flin Flon option. There had been spent, it was authoritatively stated, by these interests, over $200,000 in extensive operations in the way of diamond drilling, sinking shafts, etc., and it was an open secret that the results of this most thorough testing were favorable; but the still lower price of copper, then around 12 cents, was a deciding factor against the deal and it was not consummated. Shortly afterwards, however, the Mining Corporation of Canada bought up all the interests concerned in this property except those of the Faskens, so that these two interests now own and control the whole property, which, with its proven tonnage of at least sixteen million tons, is entitled to rank as one of the big properties of the continent.

To properly operate this mine there will be required, besides the usual mining machinery and equipment, a power development scheme, a smelter, and a railway connecting with the Hudson Bay Railway north of The Pas. Exclusive of the railway, the other essential features would mean an expenditure variously estimated at from five million to eight million before any returns would begin to come in. The owners are prepared to proceed with the work as outlined above, but await a time when the price of copper will approximate more nearly to normal.

The erection of a smelter at Flin Flon would be of great import to the owners of other properties and claims in the district and to the copper industry generally. The Mandy would resume operations, and numerous claims on Athapapuskow and neighbouring lakes, on which to date only superficial examinations have been made, would then be further developed; for there are strong indications that some of those at least will prove up and develop into real mines.

The price of copper has been gradually rising. Capitalists are becoming more interested — not only those of Eastern Canada and the States, but, owing to the rapid rise in the exchange value of the pound sterling, those also in the Old Land, so that altogether 1922 finds a more hopeful situation than has existed for several years.

INTERNATIONAL NICKEL TUNING UP.

By ALEXANDER GRAY.

While a dolorous condition pervades nickel as well as copper markets, it is to be observed that the International Nickel Corporations of the United States and Canada are adhering to their policy of putting their ablest young men into executive positions and girding them with the sinews of industrial warfare,—a policy that the new order of things will make inevitable.

Admittedly, the immediate outlook is such that the most rigid economy is essential. Readjustments in administrative departments recently necessitated regrettable changes. Universal depression has been accentuated by the death of two Presidents and two most influential directors. Ordinarily, and were it not for the perfect organization always maintained by the International corporations, the combination of adverse circumstances would be more disconcerting, especially when metal trades are askew. However, the demise of Messrs. Monell, Bostwick, Converse and DeLamar, and the consolidation of the Canadian administration have brought about the promotion of other and younger nickel masters, and there is a consequent buoyancy among the best informed, notwithstanding the fact that the immediate prospects of trade revival are somewhat discouraging.

The election of Mr. Robert E. Stanley to the Presidency of the International Nickel Corporation of New Jersey, has the happiest augury. He is an expert in whatever pertains to the metallurgy of nickel and copper and the marketing of the metals. His attainments were demonstrated while in charge of the Bayonne Refinery, and later at the Port Colborne, Refinery, which in view of enlargements that can be readily made has a capacity sufficient to meet the world's requirements. Mr. Stanley is not only a scientist, but also an executive with "the punch," and is as popular as he is competent for his responsible duties.

If Mr. Stanley lacks anything, it will be supplied by Mr. Charles Hayden, senior partner of Hayden Stone, one of the outstanding men in the metals world. Mr. Hayden's acceptance of the Chairmanship of the International Board, his great experience and intimacy with industrial chiefs and financial leaders, will be recognized as a decisive vote of confidence. No one is better equipped to succeed the late Mr. E. C. Converse.

Supplementing Messrs. Stanley and Hayden, and admirably so, are Mr. John L. Agnew, who has been the chief executive at Copper Cliff, and in charge of all operation there, and Mr. Britton Osler, of Toronto, of whose legal qualifications nothing need be urged. As directors, these two gentlemen will contribute virility and acumen. They are "en rapport" with the administration and thoroughly comprehend the potentialities of their nickel mines and plants.

Along with these are Mr. Jaretsky, a premier in his profession, Mr. Ashley, who is "au fait" with everything in Nickeldom, and Mr. Mein, a mining engineer with a reputation for rectitude and regard for economical operation. So the International Nickel Corporations are attuned to the new order of things, although the old order changeth not.

La Rose has declared a dividend of 10 per cent. payable April 20, to shareholders of record March 21. This calls for the distribution of $150,000 or slightly more than the year's profit. There remains a very large surplus. Some shareholders are expressing dissatisfaction with the management. They evidently consider it undesirable or unnecessary to keep such a large surplus.

Mr. John Wilson Jr., who for the past fifteen years has been associated with the sales organization of the Dominion Bridge Company, and its subsidiary companies, the Dominion Engineering Works and the Structural Steel Company, has accepted the position of Sales Manager with the Walsh Plate and Structural Works Ltd., of Drummondville, Que. Mr. Wilson assumed the duties of his new position on March 1.

The Vancouver Mining Convention

(by our B. C. Correspondent.)

From the mining camps of the East, Northeast, Northwest, as well as from the centres of mining activity nearer home, came members of the Canadian Institute of Mining & Metallurgy to attend the Annual Convention of the British Columbia Division of that organization held in Vancouver on the 13th, 14th, and 15th of February.

With truth it may be said "and a good time was had by one and all." The country newspaper description of the experience of those present at the township "sociable" certainly applies to the mining men who assembled at the Vancouver Hotel for the Convention in question. These meetings are not confined to the instructive, or the educative if you will. The latter features are prominent. But if the average mining man were asked what, in his judgment, are their outstanding attraction the answer would be "the reunion, the good fellowship." And really it was the opportunity offered for the renewal of friendships, the making of new and congenial acquaintances, and the exchange of reminiscences that made the last meeting go off with a swing and an enthusiasm that makes it a very pleasant memory. Of course, the background of technical and semi-technical papers, bearing on matters of interest to those facing the problems of mining in this comparatively new country, was an indispensable and a very important part of the programme. But their instruction and their information, notwithstanding its value, will take no more permanent place in the minds of the members than the rollicking time afforded by "The Smoker" and the joviality of "The Banquet." At the former, Professor Freeman's magic translation of water to an inspiring beverage, and at the latter the Hon. Wm. Sloan's (Minister of Mines) optimistic address on mining prospects were noteworthy occurrences.

The subjects dealt with at the various Sessions ranged from a review of the past year's mining to the oil possibilities of the Mackenzie River. Dean R. W. Brock, of the University of British Columbia, struck a keynote when, at the meeting's opening, he said that mineral wealth was the basis upon which the Province must build prosperity. If the same tragedy of isolation that has befallen Kentucky was not to overtake this country, mineral resources must be developed and railways built to transport the product. Mr. Sloan struck much the same note when, in the concluding address of the occasion, he declared that no adequate conception existed in the minds of mining men, or of the general public, of the possibilities of the mineral wealth of the West. If the Hidden Creek Mine and the Anyox Smelting Plant could produce practically all British Columbia's copper for 1921 and keep the output within range of that of the previous year, and if the Sullivan Mine of Kimberley and the Plant of the Consolidated Mining & Smelting Co., could produce all the lead and zinc and establish new records in respect of the production of these metals, it was hard to exaggerate the mineral possibilities of the Province.

Lieut.-Governor W. C. Nichol opened the Convention, and an early feature was a review of mining in the Province during 1921, by Wm. Fleet Robertson, Provincial mineralogist. He placed the value of production for the year at $28,504,903, a decrease of $7,038,181. The value of metal production was given as $13,232,002, and that of coal as $13,272,903. A significant point made by Governor Nichol was that "if our mineral resources are to be of the greatest value to us we must ourselves own and operate to a far greater extent than we do and not leave it all to outside enterprise." Mayor Tisdall, of the City of Vancouver, supplemented this by expressing the hope that "hereafter more local capital will be invested in our mining prospects."

The Prospector.

Wm. M. Brewer, resident government mining engineer, summed up a discussion of the prospector and the scarcity of the type so familiar in the American West throughout the latter half of nineteenth century, by charging too much education with responsibility for this decline. "The youth of today," he say, "are educated to the point where, after graduating, they contrast unfavorably the lonely life of a prospector as he climbs mountains with a pack on his back with life in a city where in a trade or profession money can be earned with ease and certainty, and with no sacrifice of comfort or of social opportunities and excitements."

Regarding present conditions and future prospects, Mr. Brewer said:

"It would not be unnatural to assume that recently graduated students from the Universities and Schools of Mines would be well equipped, by reason of their training to become successful prospectors; and, provided they also possess the essential temperamental and physical qualities, they should be ideally fitted to take up this pursuit. To-day some of the big mining companies are putting this to the test by sending out young engineers to prospect sections where minerals are likely to occur. The results are awaited with a good deal of curiosity, because, if they are successful, it would appear as though the question of the future supply of prospectors may be definitely settled by the infusion of this fresh blood; it would also usher in a new era in prospecting, and mark the disappearance of the picturesque "old timer," with his camp-fire yarns, sourdough bread, flap-jacks, bannocks, hunches, philosophy, and dreams of the untold wealth he will eventually find.

"This brings us to a query which is ever present in the mind of the writer when considering the subject of the prospector and of prospecting. Can a prospector be made by education, in a like manner to that in which a physician, lawyer, parson, or engineer is molded? The writer, speaking in the light of his own personal observations and experience, would answer this with a decided negative. The prospector is, like the poet, born, not made; and education without temperament is of no avail. In fact, prospectors have been in the past, and can be in the present day, successful without education. Conversely, they will almost certainly fail if they depend merely on education and lack the necessary mental and physical qualities."

Taxation.

The expediency of advocating the imposition of heavier taxation on crown granted mineral claims, or of requiring a certain amount of development work to be done each year in place of the present tax of 25 cents an acre, were discussed with spirit. There was a faction headed by F. W. Guernsey, mining engineer, Vancouver, in favor of some course different to the policy now existent, to the end that crown granted mineral claims, held without development and obviously

for speculative purposes, should be so dealt with that their mineral wealth would be exploited, if not by present owners, by others willing to do so. On the other hand, while it was generally admitted that in the well-prospected areas there are many dormant crown granted claims, and that such are neither healthy or desirable, strong opposition to a change developed. C. P. Hill, of the Hillcrest Collieries, argued against the principle of adding to taxation on non-productive property, title to which had been fairly earned by prospectors who had roughed it and were responsible for the discovery and opening up of the great mining camps of the West. Others acknowledged the blight of unworked claims, but felt that a radical change in the law might do an injustice to many deserving mining men. No conclusion appeared possible, and the issue was left in suspense.

Aerial Photography.

"Aerial Photography as an Aid to Prospecting" was dealt with by Major E. MacLaurin, the claim being made that the airman, with present equipment, can render valuable assistance to the prospector. His explanation was that large tracts of territory could be photographed in strips, pieced together and the final mosaic would permit careful study and consideration before entering the country. From this mosaic the prospector could prepare his field map, showing the drainage of the country, the best route for entry, the relative locations of mountains, valleys, lakes and other important information as to cover, rock croppings, etc. Major MacLaurin stated that conditions in this Province were favorable for this kind of preliminary exploration. "In my experience,," he declared, "an efficient seaplane or flying boat may move almost anywhere in comparative safety, as the province abounds in lakes and rivers suitable for emergency landings. As far as I know, very little use has been made of aircraft by mining men. Outside of one or two photographic surveys of oil properties in the South, the Imperial Oil Company's experiment in the Peace River Country, and a flight made by Professor Bruce, of Queen's University, last summer in Northern Ontario, not very much has been done. British Columbia is exceptionally well suited to the operation of aircraft. Its physical features are exceptionally rough, offering difficulties to the ordinary means of locomotion, while its innumerable lakes and rivers provide splendid natural landing places. Straight-forward flying, with a reliable pilot and a properly cared for machine, offers a perfectly safe and sane means of travel."

Coal Measures Of Vancouver Island.

J. D. Mackenzie, of the Canadian Geological Survey, gave a talk on the coal measures of Vancouver Island, referring particularly to the Cumberland Field. Briefly he told of the badly broken and faulted nature of the veins of the locality and the consequent difficulties in their development. Thos. Graham, of the Canadian Collieries (D) Ltd., said that his Company had sunk between 150 and 175 drill holes in this section and had failed to correlate the seams. The commercial exploitation of the field always would be accompanied by serious problems. Prof. Daniels, of the University of Washington, who was on this Vancouver Island field last Summer, corroborated these statements.

Pulverized Coal.

William Calkins, of Seattle, in discussing pulverized coal and its use declared that where it had been applied in a large way the results were satisfactory. It had yet to be demonstated, however, that it was adaptable to smaller plants with success. Col. J. E. Leckie, president of the Institute, saw hope for the coal industry of the Province in its struggle with the competition of foreign fuel oil if the pulverized coal process becomes perfected. Another view was that with increasing difficulties in coal mining, pulverization and flotation are destined to play more important parts in the solution of the operators' problems. It was stated that the Pacific Coast Coal Company, of Washington State, through the installation of a coal pulverization plant, had been able to save much of its hitherto wasted production. As one speaker put it, "If we can recover coal now too high in ash content for domestic use, we are going to eliminate much of the present loss in coal mining."

The Crows Nest Field.

Robert Strachan, senior mines inspector, took for his text the Crows Nest Pass Coal Field. More than 17,000,000 tons of coal had been won from this field since 1897, and almost 4,000,000 tons of coke have been made from the coal produced. There still remained in the Crows Nest Pass Field 1500 times the amount of coal taken away. With the inclusion of the Upper Elk Crown Mountain, and the Flathead the amount of available coal was more than 2250 times what had been extracted. He dealt with the markets, showing that they had been considerably curtailed in recent years, with the result that the industry had not grown in proportion to its possibilities. On this point it was said that about 60 per cent of the product finds a ready sale in the United States in competition with the coals of Wyoming, Washington, and Montana. Existing freight rates and adverse grades accentuated the market difficulties of the operating companies.

Coal Mining Methods.

A paper on coal mining in the Nicola, Princeton District referred particularly to methods at the Coalmont Colliery, the only plant of the kind in the Province to use an aerial tramway as an important feature of its transportation system. One of the specially interesting papers of this series was by P. E. Peterson on "The Flotation of Coal." He described in detail the plant being installed under his supervision in connection with the Western Fuel Corporation, Nanaimo, B. C., and explained that, while the innovation will not revolutionize present methods of coal washing, it will serve as a useful adjunct in recovering the dust that in the past has been lost. Prof. W. L. Uglow, of the University of British Columbia, discussed an Eocene coal basin at Chu Chua, which is on the east of the Thompson River.

The Britannia Mine.

General mining and milling practice at the Britannia Mine, Howe Sound, was discussed by C. P. Browning. Of the geology of the property he said that mineralization is confined to a shear zone entirely within a belt of metamorphosed sedimentary and igneous rocks which forms an inclusion in the granodiorite batholith of the coast range. He took up the different claims and mining operations, giving exhaustive accounts of both. He concluded that having power entirely produced on the property "the whole operation of mining, transporting, and concentrating a capacity of 2,500 tons of ore daily is more or less a self contained unit, with the exception of the smelting and refining of the copper concentrates."

Mackenzie Oil Field.

"Oil Possibilities of the Mackenzie River" were described by Prof. M. Y. Williams. He recounted the results of the prospecting of the Imperial Oil Company

A gusher had been struck, capped, and later the flow had declined. It was not likely that, whatever the field developed into, it would produce what were commonly referred to as gushers. There was this to be remembered, that the Company had not to sink far before obtaining the oil of which the world knew.

Address By The Minister Of Mines.

Mr Sloan, the minister, received a very cordial welcome at the banquet of Wednesday evening, the concluding session.

He prefaced his remarks by saying that, notwithstanding the hard year in the mining industry, the cheerful enthusiasm of the convention was an inspiration. The mining man is no quitter, and there is no place in the business for the man who lives in the past. The Minister reviewed the production of the year, showing that the total value of mineral production was in the neighborhood of $28,000,000, a decline of approximately $7,000,000 in comparison with the previous year, or roughly 20 p.c. He, however, pointed out that if this matter was a matter of condolence, the production of the State of Arizona showed a decline of 77 p.c., Montana 75 p.c., Utah 55 p.c., Idaho 51 p.c., and Nevada, 50 p.c.

"The perseverance and the confidence of the independent operators, the smelter companies, and the prospectors in all sections of the province are to be commended and should be encouraged. The Provincial Government has spent substantial sums in the past years in the construction and maintenance of roads, trails and bridges to mining properties. Miners have been given the benefit of the advice of qualified mining engineers, and the Mines Department has endeavored to keep in close touch with such organizations as the Canadian Mining Institute and the Prospectors' Protective Association, in order that the needs of those indentified with the industry might be clearly understood and every thing possible done to meet requirements, always having in mind financial limitations by reason of the heavy demands on the Provincial Treasury from many other sources.

"Within the past few years there has developed in Bristish Columbia a mining district the potentialities of which we are beginning to grasp. I don't think, however, that any of us yet have an adequate conception of the possibilities of the Portland Canal and the mineral-bearing zone of that and adjacent areas. If the next decade were to give birth in this part of our Northwest to one or two more properties such as that of the Premier Gold Mining Co., we would quickly take a first place among the gold and silver producing countries. There is no reason why this should not happen. Reports indicate that it is well within the bounds of possibility. Operators and prospectors from this part tell us that there is nothing more certain. Of course they are so proverbially optimistic that their statements sometimes need amendment. In this case, however, there is support from geologists and mining engineers of repute, and there is the indisputable evidence of the production of a wonderful mine.

The Northwestern Mineral Survey District, within which is the Portland Canal Division, is estimated to have turned out 75,000 tons more ore in 1921 than in 1920. The gold output exclusive of placer, which was about the same as in 1920, showed an increase of approximately 30,000 ounces, some 60 per cent greater than the figures of the previous year. The silver yield for 1921 is reported to be about 1,500,000 oz., an improvement of about 125,000 oz. Both the gold and silver outputs are due, almost entirely, to the Premier Gold Mining Co., that company's production of silver alone aggregating over 1,000,000 oz.

The Hon. Mr. Sloan then proceeded to review the coal mining industry, which for many years past has been the leading producer in point of value in the province.

"With coal fields of great extend awaiting exploitation, it does not seem right that development, as indicated by annual production, should be stationary. We should be making more rapid strides in this industry. Our material prosperity as a Province and as individuals depends more than we appreciate upon realizing in greater degree these great and practically untouched natural resources.

"This brings us, in natural sequence, to the question of markets. Our coal seeks the points of greatest demand. That is the inexorable law of trade. In the summer months it is absorbed chiefly by vessels plying the North Pacific, by foreign consumers, and those within the Province who use it industrially. In the winter season the domestic trade becomes substantial. Under these conditions it is easy to understand that the market fluctuates violently. Experience has been that in summer the collieries to a large extent have worked only part time, while in the winter on occasion they have had difficulty in supplying the demand. Such a condition is most unsatisfactory. To have plenty of coal available at the minimum price, there must be a steady and a healthy market, so that the mines may be kept working at full capacity. The manufacturers, businessmen, and citizens generally of the Province can help in bringing about this change, and no doubt will do more when more clearly understanding what it means to themselves and to the country."

The Minister then drew a very happy comparison between the results of the State of Arizona and that of British Columbia. In this connection he said:

"The mining history of the State of Arizona makes an interesting study in considering the situation in British Columbia. That State has an area of 113,953 square miles as compared to this Province's 402,660 square miles. The value of the State's mineral output in 1918 was $202,134,880 and British Columbia's $41,782,474. There is a wide gap here. I may be thought unduly optimistic, but the time is coming when the gap will be bridged. Arizona, scarcely more than one-fourth the size of British Columbia, produces enough mineral wealth in any one normal year to pay our total debt, to buy the P. G. E. several times over, to furnish freight for our transportation lines that will forever silence the argument sometimes heard that we cannot feed the railroad sufficiently to warrant treatment on an equality with other Provinces in point of rates, and to relieve our government and our people of all their financial problems.

"It may be said that Arizona is exceptionally endowed in mineral resources. That it true. To become the biggest metal-producing State of the Union, responsible for 40 p.c. of the copper mined in the United States, it must have unusual wealth. The same happy condition, however, exists in British Columbia. Such is my conviction. It is justified, I maintain, when we find a single mine in British Columbia producing almost 34,280,000 lb. of copper, the total of last year's output. Further confirmation is supplied by the fact that a single mine provides the bulk of the 45,000,000 lb. of zinc that we produced in 1921. When we consider these facts and then reflect upon the vast ex-

tent of British Columbia's undeveloped and unprospected mineral-bearing zones, it is possible to realize something of the possibilities. British Columbia has roughly 268,600 square miles of mineral-bearing territory, as against Arizona's total area of 113,953 square miles. In British Columbia, 44,225 square miles may be said to be producing. Of the possibilities of the remaining 224,375 square miles we have no more than general geological knowledge. Under the circumstances can it be said to be an extravagant prediction that the future holds as much in store for British Columbia as has been bestowed upon the State of Arizona?

"If we take the adjoining States of Washington, Oregon and Idaho, the comparisons are interesting and favorable. The three could be fitted into British Columbia, and our Province would be scarcely more than half covered. Add California, with her area of 158,297 square miles, and the sum for the four States comes to 408,011 square miles, a few thousand more than the area of this Province. These facts will serve to drive home the extent of our heritage."

He then paid a tribute to the department of Geology and Mining at the University of British Columbia, paying especial attention to the eminent qualifications of each member of the staff and showing the opportunities afforded of studying under these men. He thought that the University of British Columbia must soon be recognized as the principal center for geological research in Canada. In conclusion, the Hon. Mr. Sloan said:

"The twentieth century, it has been said, will be Canada's century. Never was there a truer prophecy. But I feel that it has a peculiar significance in its application to British Columbia. We are facing unprecedented development of trade and commerce on the Pacific. The signs of this are clear. The effect of the opening of the Panama Canal is being made apparent The industrial advance of Japan likewise is reacting on the Pacific Coast of the American continent. We, a naturally rich and little developed country, stand at the gateway. It will be our own fault if we fail to take the fullest advantage of our opportunity that presents itself not only in connection with the mining industry, but in respect of all those industrial activities that are the life blood of our civilization."

HYDRO ELECTRIC DEVELOPMENT IN U.S.

The U. S. Geological Survey has just published data regarding water-powers up to the end of 1921

At present there are in the United States 3,116 water power plants of 100 horsepower or more, with a total capacity of installed water wheels of 7,852,918 horsepower. Of this total 79 per cent is in public utility plants and 21 per cent in manufacturing plants. New York still maintains its position as the leading State in the amount of developed water power, with 1,291,857 horsepower. California is a close second, with 1,119,099 horsepower; Washington it third, with 151 356 horsepower. Maine closely follows in fourth place, with 449,614 horsepower; and Montana is fifth with 344,420 horsepower.

The latest survey of the potential water power that is capable of commercial development shows a total of 28,000,000 horsepower minimum, and 51,000,000 horsepower maximum. The minimum is based on the average flow of the two seven day periods of lowest flow in each year of record

OIL FROM SHALE.

There is the possibility, after years of bitter disappointment, and the loss of a million and a half of British capital, of the Commonwealth Oil Corporation yet making good. The company was formed in 1905, under favourable auspices; a new plant was laid down at Wolgan Valley, and a line of railway built from Newnes, on the main western line, to the works, a distance of 32 miles. An immense area of oil shale has been proved to exist, some of the seams being narrow, but on the Capertee side a width of 3 to 4 ft. has been exposed by tunnel for a distance of 4000 ft., which will yield from 100 to 150 gallons of crude oil per ton. Disastrous strikes and unreasonable demands by the men ruined the whole business, making the cost of production so high that even a small margin of profit was out of the question, and resulting in the closing down of what, under fair working conditions, would have developed into a paying concern of immense magnitude employing thousands of hands. Over two years ago Mr. John Fell entered into an agreement with the company, which provided for him to work the concern, on behalf of himself and the company, the further capital required to be equally provided by the parties to the agreement. Mr. Fell thereupon set about to try to determine a cheaper mode of working, and he now appears to have solved the problem.

The scheme is a bold one, and on the face of it looks somewhat risky, as it involves the setting alight of the shale body **in situ**, and converting the mountain into a series of retorts. The sections treated are blocked out, and bricked in, and air is carried in to regulate the fire and keep it under proper control. So far much success is attending the system, and from a "kiln" recently opened, the oil was flowing in such quantities that it was difficult to provide sufficient containers to receive the outflow. Out of the burning shale a large quantity of gas is issuing, and it is intended to utilise this gas to drive engines for the generation of electricity. This, apart from oil production, opens up a wide field for the cheap supply of electric energy to the whole of the Lithgow district, including the railways. "As the crow flies," Newcastle is distant only about 70 miles, and a cable could provide electric power to that centre also. So far as matters have advanced under Mr Fell's direction, the prospects for the company appear bright, and provided no untoward catastrophe occurs, such as the igniting of miles of shale seams, so causing the biggest roaring inferno ever known there may be millions of money in it for shareholders.

The "Sydney Morning Herald" of October 29, referring to this apparently venturesome scheme, says that the "experiment has been under consideration for some years and permission was granted by the Mines Department about four years ago to enable the method of attacking the shale deposits to be put in operation."

The conservation of opinion amongst the officers of the Mines Department when permission was sought was that it involved absolutely no danger. From the Wolgan to the Capertee side the seam dips slightly and the firing is being done with the dip. In this way the fire needs coaxing. Air has to be introduced to keep it going. This affords the necessary means of control which eliminates any source of danger. The Industrial Australian and Mining Standard

Northern Ontario Letter

THE GOLD MINES.

Hollinger.

The Hollinger annual statement, for which mining men had been waiting, brought no surprises. Ore reserves were maintained, while net profits amounted to 16½ p.c. In addition to paying 13 p.c. in dividends, upwards of $800,000 was added to surplus. In view of this achievement, which was accomplished in spite of extremely adverse conditions during the first three or four months of the year, the Hollinger is expected to encounter no difficulty in showing a net profit of approximately 20 p.c. for the current year.

Dome.

A party of directors of the Dome Mines visited the property this week. The company will end its fiscal year on March 31. From unofficial figures published in leading newspapers throughout the country, it would appear as though the profits are exceptionally large. Certain papers go so far as to state that the net profits during January and February were at the rate of 75 p.c. annually on the company's issued capital, and that the net profits for the first two months of the year would alone be sufficient to cover the regular dividends for the whole of the year. A feature is that the Dome has risen from the largest low-grade gold mine in Canada to one with ore so rich that the mill is being operated on a grade of ore which is even richer than the average at the Hollinger Consolidated and the McIntyre-Porcupine. In view of the current net profits being so large, the capital repayment of $1 per share which will be made to stockholders of record March 31 will not be seriously felt, and may be paid out of profits accumulated since the beginning of January.

Power from Sturgeon Falls.

In connection with power development in the Porcupine district, the Northern Canada Power Company will utilize electric energy from Sandy Falls with which to provide motive power in connection with the work of harnessing Sturgeon Falls. This will expedite the work and is expected to make it possible to provide an additional 6,000 to 7,000 horsepower by the end of the year.

Thompson-Krist.

According to information available here, the Thompson-Krist interests have only this week to make good on their liabilities in connection with the Northerown Mines, of which they hold a minority of shares. The obligations are said to amount to approximately $40,000. Failure to comply with this is believed to point to the danger of foreclosure.

McIntyre.

The proposed sale of treasury shares in the McIntyre Porcupine is stated on the street to involve a price at the rate of $3 for each of the old shares, or at the rate of $15 per share for the new. It is intimated that, in addition to providing over $1,000,000 in cash, a plan has been under consideration among insiders to operate a pool and possibly turn attention to the market for a time. In the meantime, the work of enlarging the mill is proceeding, and the production during the last half of the current year will register an increase of upwards of 40 p.c., or close to a total of $3,000,000 per year. It is also considered probable that, in addition to having an eye on the Plenaurum and the Newray properties, the McIntyre is casting covetous glances toward the Shumacher. The acquisition of these three properties would give the McIntyre a big acreage and might place the enterprise in a position to make a bid for a leading place in the business of gold mining.

Keora.

Plans have been made to endeavor to raise money with which to reopen the Keora property. The outcome of the effort may be known within the next sixty days.

Porcupine V. N. T.

Arrangements have been made to commence work on the Porcupine V.N.T. early in April. Work for the beginning will consist of continuing the shaft from its present depth of 600 feet to a depth of 900 feet. Levels will be opened up at 600, 750 and 900 feet deep.

It is also planned to resume operations on the property of the Porcupine Crown this spring.

Night Hawk.

The Night Hawk Lake Mining Company, which holds property on the east side of Night Hawk Lake, and which has met with encouraging results during the course of diamond drilling is negotiating for the sale of its property. Good reports are coming from both the Night Hawk Lake and the Peninsular, which adjoins.

Ontario-Kirkland.

A merger of the Ontario-Kirkland Gold Mines with the Montreal-Kirkland is being negotiated. The directors have already agreed upon terms, and the stockholders of the Ontario-Kirkland are to vote on the question on March 9th and on the Montreal-Kirkland on the 15th. A new company with $5,000,000 capitalization, made up of 5,000,000 shares of the par value of $1 each, will be incorporated. Of this, the Ontario-Kirkland will be given 1,500,000 shares with 1,725,000 shares to the Montreal-Kirkland. The new company will assume the present liabilities of about $125,000 against the Ontario-Kirkland. The large allotment of stock to the Montreal-Kirkland has occasioned considerable surprise.

Tough-Oakes.

At the annual meeting of the Tough-Oakes Gold Mines, according to official advice to the Journal, the announcement was made that milling operations would be resumed early in April. The mine is now in good physical condition, due to the favorable developments at depth on the main break which dips onto the Burnside. The mill has a capacity for handling 120 tons of ore daily and is expected to produce about $12 per ton.

Atlas.

A contract is being let to explore the Atlas property by diamond drill. Following the recent friction between certain of the interested parties, the following board of directors was elected: President, I. Singer; 1st Vice-President, Mr. Nesbitt; 2d Vice-President, Mr. Mathieu; Sec.-Treas., R. Davis, with M.P. McDonald managing director.

Lightning River.

An enthusiastic meeting was held in Guelph by the Lightning River Gold Mines. About 70 stockholders were present. John W. Morrison pointed out that the physical condition of the company's property in the Lightning River district warrants aggressive work. The vein had a width of 30 inches at surface and has widened to 69 inches at a depth of 40 feet. Mr. Morrison stated that the indications were that considerable commercial ore could be developed. He advised the stockholders not to consider the question of putting in

a small mill at present, but to find means of carrying out extensive development work, with a view to determining the extent of the mineralization, and possibly proceeding at a later date with the construction of a large mill. It is understood that this plan will be followed. A by-law was passed, changing the head office from Haileybury to Guelph. It was also announced that two more mining claims had been purchased. Following are the officers and directors: President and general manager, W.J. Lucy; 1st vice-president, John W. Morrison; 2nd vice-president, W. Cochenour; Sec.-treas., Udney Richardson; directors, Dr. Robt. Lucy, Mr. Hewer and Mr. Treleavan. An endeavor will be made to raise a substantial treasury fund for carrying out work commensurate with the merit of the property.

Locating Placer Claims.

Considerable excitement has developed in connection with the reported discovery of placer gold in that area lying east of Matheson on the T. and N. O. Railway, which was recently announced in these columns. Mining claims are being staked out for placer in the townships of Munro, Michand, McCool and Guibord, and already between 75 and 80 have been recorded. These are distributed with 42 in Munro, 22 in McCool and 12 in Michand.

Reports tell about the discovery of gravel and sand in which fine nuggets of gold occur. Other reports are less optimistic, but the discovery has been sufficient to send a host of prospectors to the district, and interest is running high.

It is pointed out that geologists are at one in believing that hundreds of feet of the gold-bearing formations of Northern Ontario have been eroded during past centuries, and that, as in the case of Porcupine, this erosion may have ground down rock which yielded possibly hundreds of millions in gold, all of which may either be lying at some point of concentration or be scattered far and wide in too small quantities to be found or mined profitably.

Just what further work in the Matheson and Munro township area will reveal is a matter which may only be decided as exploration work proceeds, and, in the meantime, prospectors who are "loath to overlook any reasonable bet" are found staking out mining claims in this new prospective field.

A point of interest is that the placer discovery lies in the vicinity of the Croesus mine, which yielded such fabulously rich specimens of gold quartz some years ago.

THE SILVER MINES

Silver Production.

A feature in connection with silver mining in this field is that the O'Brien Mine has won its way to the position of being the second largest silver producer, ranking second only to the Nipissing. The official figures for 1921 now available, show the following:

Company	Ounces Silver Produced
Nipissing	3,012,611
O'Brien	1,408,890
Conagas	1,301,860
Mining Corporation	896,627
La Rose	658,123
Keeley Silver Mines	281,659
Miller Lake-O'Brien	223,168

Figures for the Bailey Silver Mines are not available at the time of writing.

A total of 8,279,320 ounces of silver was produced from Cobalt, South Lorrain and Gowganda in 1921, another feature being that, although the Keeley commenced production only in the early summer, the output by the end of the year exceeded that of Gowganda.

Interest is keen in South Lorrain. One leading mining concern in the Cobalt district offered $50,000 in cash for a property in that area. The offer was refused, although possibly a year ago the owners of the property would have jumped at it.

Nipissing.

It is stated in Cobalt that the Nipissing Mining Company has optioned the Jordan group of claims in Northern Manitoba.

Claims Thrown Open.

A repetition of last year's clean-up of claims in arrears with dues to the Provincial government has been made in the Temagami Forest Reserve. An Order-in-Council, signed by Hon. Harry Mills, cancels the leases under which such claims were held.

As no provision is made for reinstatement of the former owner's rights, restaking by outsiders will hit hard some of the syndicates and companies, particularly in James township of the Elk Lake field, that have done a large amount of development work on their claims.

CANADIAN MINERAL PRODUCTION LESS IN 1921

The Dominion Bureau of Statistics has published a Preliminary Report on the Mineral Production of Canada which shows that the economic minerals produced during the calendar year 1921 reached a total value of $172,327,580, as compared with $237,422,857 for the preceding year. The report was prepared under the direction of Mr. S. J. Cook, Chief of the Mining, Metallurgical and Chemical Branch of the Bureau.

By classes the value of the mineral production during the year comprised: metallics $52,580,000, non-metallics $89,405,000, and structural materials and clay products $30,342,000.

The principal mineral-producing province, according to the returns for 1921, was Ontario, the mineral output from this province being valued at $54,505,770. British Columbia came second with a mineral production worth nearly $35,000,000. Nova Scotia was a close third with $32,5000,000; Alberta ranked fourth with $29,000,000. Quebec was fifth with $11,600,000, and Manitoba, Yukon Territory, New Brunswick and Saskatchewan followed in the order named, with productions between one and two million dollars each.

The ten principal products of the mineral industries of Canada in 1921, arranged in order of value, were coal, $74,273,000; gold, $21,327,000; silver, $9,185,000; copper, $7,459,000; nickel, $6,752,000; natural gas, $4,902,000; asbestos, $4,807,000; lead, $3,855,000; zinc, $2,758,000, and gypsum $1,726,000.

The report contains forty three pages of reading matter and tables, giving in detail the statistics relating to the production of Canadian minerals during 1921. Copies may be had on application.

One-third the electric power produced by public utility plants in the United States is hydro-electric. The remaining two-thirds requires the annual consumption of forty million tons of coal, twelve million barrels of fuel oil, and twenty billion cubic feet of natural gas.

BOOK REVIEWS.

A Coal Manual for Salesmen, Buyers and Users, by F. R. Wadleigh. Published by National Coal Mining News, 831 Union Trust Building, Cincinnati, Ohio, 184 pages. Price, $2.50.

The ordinary user of coal is wonderfully and fearfully ignorant of the limitations and idiosyncrasies of that mineral. For instance, the difference between "fixed" (or "inherent") ash and "extraneous" ash is without meaning to him. The Coal Manual throws light upon this very practical phase of coal consumption, and upon many other such phases. In short, it is designed to lighten the darkness of the head of the family who continually wonders why his furnace is so reprehensibly unsatisfactory.

This, however, indicates only a part of the scope of the volume.

The industrial use of coal is clearly dealt with. Particularly interesting are references to "Alcohol from Coal" (Ware, Volstead Act!) and "Low Temperature Carburization." Instructions as to the storage of coal are sane and practical.

It is a pity that the little volume before us has not been more carefully prepared typographically. The material is excellent; it deserves a better "corpus".

Mineral Land Surveying, by James Underhill, Ph.D. Third Edition Revised. Published by John Wiley and Sons, Inc., and the Renouf Publishing Co., Montreal, Que. Price, $3.50.

Earlier editions of this useful treatise will be familiar to many of our readers. To the mining engineer who may at any time be called upon to follow his calling in the United States, "Mineral Land Surveying" will be a competent guide. It is a pity that a similar volume, written from a Canadian point of view, has not been published.

Burning Liquid Fuel, by Dr. William Newton Best, F.R.S.A., etc. Published by the U.P.C. Company, 234 W. 39th St., New York. Price, $5.00 net.

There can be no doubt as to Dr. Best's qualifications for the task of writing a book on Burning Liquid Fuel. Neither can there be any doubt that most of us are ill-informed upon the subject, if not entirely ignorant.

Describing his early experiences in burning crude oil, Dr. Best alludes to the devices then used as being "even more crude than the oil we were attempting to burn." However, the first locomotive equipped for oil burning by Dr. Best showed a 15 per cent. better performance than when burning coal.

During a long career in his chosen field, Dr. Best has installed oil burners in a great variety of furnaces used in many diverse industries — bread baking, brick making, glass furnaces, and so on. He emphasizes the especial need of expert guidance in the use of oil fuel, and very strongly deprecates the unwise practice of approaching the subject from a purely theoretical stand point.

Right and wrong oil systems are fully described, and illustrated diagrammatically. Foundry practice, copper industry practice, cement, lime glass, and many other uses of oil burners are adequately touched upon.

To Canadian engineers, metallurgists and manufacturers, this book should appeal strongly. Canada is only at the beginning of her metallurgical career. A record of practical experience and achievement, such as is outlined in the volume before us, should not be overlooked.

ASBESTOS.

In his report to shareholders of Asbestos Corporation of Canada, President W. G. Ross states that shipments of raw asbestos during 1921 were about 45 per cent of that made the previous year. The orders on the company's books, though less than a year ago, are still considerable. The looked-for revival in trade should increase demand by manufacturers. The years profit was $543,258. Dividends amounted to $460,000. Surplus is $2,136,090.

Zirconium and its alloys or compounds are finding increasing uses as an acid resistive metal, for electrodes, for armor and automobile steels, abrasives, pigments, mordants, insulators, fire brick, and other products.

MINING QUOTATIONS.

Quotations on Active Stocks on Standard Stock Exchange, Toronto, for week ending March 7, 1922.

Silver	High	Low	Last
Adanac Silver Mines, Ltd	1⅜	1	1¼
Bailey	3	2⅜	3
Beaver Consolidated	35½	28	30½
Chambers-Ferland	3¼	3¼	3¼
Coniagas	135	125	135
Crown Reserve	20½	18	19
Gifford	1⅛	1	1
Hargreaves	1	1	1
La Rose	67	50	53
McKin.-Dar.-Savage	23	19	22½
Mining Corp. of Can.	115	100	100
Nipissing	675	660	660
Ophir	2¼	2	2¼
Peterson Lake	7¼	6	6½
Silver Leaf	2	2	2
Temiskaming	34	31½	33
Trethewey	6½	4¼	5¼
Gold			
Apex	2½	1⅞	2⅛
Atlas	20½	19	20¼
Boston Creek Mines	8	8	8
Dome Extension	88	88	88
Dome Lake	9	8	8
Dome Mines	2585	2500	2570
Gold Reef	4	2¾	3
Hattie Gold M. Ltd.	24½	21½	22
Hollinger Cons.	905	860	905
Hunton Kirkl'd G.M.	9⅝	8	9⅝
Keora	13½	10½	11
Kirkland Lake	46	38	40
Lake Shore M. Ltd.	175	165	170
McIntyre	1500	1450	1485
Moneta	13½	11	12½
Newray Mines, Ltd.	11	10	10
Porcupine Crown	28	23½	24½
Porcupine Imperial	1	1	1
Porcupine V.N.T.	28	25	26½
Preston East Dome	6½	5	5¾
Schumacher	48	43	45
So. Keora	30	30	30
Teck-Hughes	43	38	40
Thompson Krist	4½	3¾	3¾
West Dome	9½	7½	8½
West Tree Mines Ltd.	4½	4	4¼
Wasapika	4	3½	3⅞
Miscellaneous			
Petrol Oil	18½	18	18

The Canadian Miners' Buying Directory.

Acetylene Gas:
Canada Carbide Company, Ltd
Prest-O-Lite Co. of Canada, Ltd

Acetylene Welding:
The Toronto Iron Works, Ltd.

A C. Units:
Powley & Townsley, Limited.

Agitators:
The Dorr Co
Can. Chicago Bridge & Iron Co., Ltd.
Horton Steel Works, Limited.

Air Compressors:
Bellliss & Morcom, Ltd.
Laurie & Lamb
Sullivan Machinery.

Air Hoists:
Canadian Ingersoll-Rand Co Ltd
Mussens, Limited.

Air Receivers:
The Toronto Iron Works, Ltd

Alloy and Carbon Tool Steel:
Peacock Brothers Limited.

Alternators:
MacGovern & Co

Aluminium:
Spielman Agencies, Regd

Amalgamators:
Northern Canada Supply Co.
Mine and Smelter Supply Co
Wabi Iron Works.

Antimony:
Canada Metal Co.

Antimonial Lead:
Pennsylvania Smelting Co

Assayers' and Chemists' Supplies:
Dominion Engineering & Inspection Co
Lymans, Limited
Mine & Smelter Supply Co.
Pennsylvania Smelting Co.
Stanley, W. F. & Co., Ltd.

Ash Conveyors:
Canadian Link-Belt Company

Ashes Handling Machinery:
Canadian Link-Belt Co., Ltd.

Assayers and Chemists:
Milton L. Hersey Co., Ltd.
Campbell & Deyell
Ledoux & Co.
Thos. Heys & Son
C. L. Constant Co.

Asbestos:
Everitt & Co.

Balls:
Hull Iron & Steel Foundries, Ltd
Peacock Brothers Limited.
The Wabi Iron Works.
The Hardinge Conical Mill Co.
The William Kennedy & Sons, Ltd.

Ball Mills:
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd
Mine & Smelter Supply.
The Wabi Iron Works.

Babbit Metals:
Canada Metal Co.
Hoyt Metal Co.

Ball Mill Feeders:
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd
Mine & Smelter Supply.

Ball Mill Linings:
Hardinge Conical Mill Co
The William Kennedy & Sons, Ltd
Peacock Brothers, Limited
Hull Iron & Steel Foundries, Ltd
Mine & Smelter Supply.

Balances — Assay & Analytical:
Mine & Smelter Supply.
The William Kennedy & Sons, Ltd

Belting—Leather, Rubber and Cotton:
Canadian Link-Belt Co., Ltd
Northern Canada Supply Co.
Jones & Glasco.

Belting:
R. T. Gilman & Co
Gutta Percha & Rubber, Ltd

Belting—Silent Chain:
Canadian Link-Belt Co., Ltd
Hans Renold of Canada, Limited, Montreal
Jones & Glassco (Regd)

Belting (Transmission):
Goodyear Tire & Rubber Co

Belting (Elevator):
Goodyear Tire & Rubber Co

Belting (Conveyor):
Goodyear Tire & Rubber Co
Gutta Percha & Rubber, Ltd

Bins and Hoppers:
The Toronto Iron Works, Ltd.
Can. Chicago Bridge & Iron Co., Ltd.
Horton Steel Works, Limited.

Blasting Batteries and Supplies:
Canadian Ingersoll-Rand Co., Ltd
Mussens, Ltd.
Canadian Explosives, Ltd.
Powley & Townsley, Limited.

Bluestone:
The Consolidated Mining & Smelting Co
The Coniagas Reduction Co., Ltd.

Blowers:
Canadian Fairbanks-Morse Co., Ltd
Northern Canada Supply Co.

Boilers:
Canadian Ingersoll-Rand Co., Ltd
Marsh Engineering Works
R. T. Gilman & Co.
The John Inglis Company
Wabi Iron Works.
The William Kennedy & Sons, Ltd.

Blue Vitriol (Coniagas Red):
Canadian Fairbanks-Morse Co., Ltd

Bortz and Carbons:
Diamond Drill Carbon Co.

Boxes, Cable Junction:
Standard Underground Cable Co. of Canada, Ltd.
Northern Electric Co., Ltd.

Brazilian Rough Diamonds:
Diamond Drill Carbon Co.

Brazilian Mica:
Diamond Drill Carbon Co.

Buggies, Mine Car (Steel)
Hendrick Manufacturing Co

Brazilian Ballas:
Diamond Drill Carbon Co.

Brazilian Rock Crystal:
Diamond Drill Carbon Co.

Brazilian Tourmalines:
Diamond Drill Carbon Co

Brazilian Aquamarines:
Diamond Drill Carbon Co.

Bridges—Man Trolley and Rope Operated—Material Handling
Canadian Mead-Morrison Co., Limited

Bronze, Manganese, Perforated and Plain:
Hendrick Manufacturing Co.

Buckets:
Canadian Ingersoll-Rand Co., Ltd
R. T. Gilman & Co.
Hendrick Manufacturing Co
Canadian Link-Belt Co., Ltd
Marsh Engineering Works
Mussens, Ltd.
MacKinnon Steel Co., Ltd
Northern Canada Supply Co.
The Wabi Iron Works
The William Kennedy & Sons, Ltd

Buckets, Elevator:
Canadian Link-Belt Co., Ltd.
Hendrick Mfg. Co
Peacock Brothers Limited
The William Kennedy & Sons, Ltd

Cable—Aerial and Underground:
Canada Wire & Cable Co
Northern Canada Supply Co
Standard Underground Cable Co. of Canada, Ltd
Peacock Brothers, Limited

Cableways:
Canadian Mead-Morrison Co., Limited
Fraser & Chalmers of Canada, Ltd
Mussens, Ltd
The Wabi Iron Works
R. T. Gilman & Co.

Cages:
Canadian Ingersoll Rand Co., Ltd. Montreal, Que
Northern Canada Supply Co.
Fraser & Chalmers of Canada, Ltd
The Mine & Smelter Supply Co
Mussens, Ltd.
The Wabi Iron Works
The William Kennedy & Sons, Ltd

THE NIGHT HAWK LAKE DISTRICT.

(Special Correspondence.)

At Connaught Station the Porcupine branch of the Temiskaming and Northern Ontario Railway crosses the Frederickhouse River near its entrance into Frederickhouse Lake, or rather the flat which was once the bottom of that lake. The story of its drainage is worth telling. Up to 1909 the level of the lake was maintained by a natural dam a few miles below the outlet of the lake, where the river flowed over a ledge of rock with a drop of 46ft. To enable him to further explore an outcrop on the bank of the river, Father Paradis cut a pilot ditch around the rocky ledge and through the higher part of the natural dam, which happened to be clay. The river did the rest, wearing its channal down through the clay, draining the greater part of the lake, and spoiling the potential water power. This lake-bottom may be of use as farming lands, although attempts to use it so far have been discouraging. Some interesting finds on the lake bottom have been made. Your correspondent was shown a copper skinning-knife picked up by a Connaught resident, George David, apparently of primitive manufacture. The copper may have come from Lake Superior, although there is a possibility that it may have been brought from the far north, the Coppermine River region. A later implement used by Indians was found by David, a hand made iron tomahawk which, I suppose, dates sometime since the arrival of the white men.

Another expansion of the Frederickhouse River is Night Hawk Lake, which begins up the river about seven miles south of Connaught. Discoveries of gold have been made about this lake, the shores of which are largely rocky, although the surrounding country is mostly drift-covered. A promising prospect is being developed under the management of Mr. A. R. Globe. The shaft is down 200 feet, and about 600 feet of drifting has been done. Here, as in the Abitibi Lake area, the gold has been found in association with basic lava flows. This greatly enlarges the possibilities of discovery of gold; and, taken with recent finds in the Goudreau area, so close to the iron formation, it should lead to careful prospecting of rocks which have hitherto been looked upon as very unpromising.

Other minerals that have been found in paying quantities in this district are barite and pyrite in Langmuir Township. The latter is said to be in large quantities and within easy reach of transportation. If quality and situation are right it should be easy to induce the Iroquois Falls people to use it instead of the native sulphur they are importing from Louisiana for the sulphite pulp process. A little native silver is found in the barite, and curiously enough this rather spoils it for grinding.

The considerable areas of serpentine in this district are receiving attention. The notice of prospectors has been called to the possibility of finding asbestos in this rock. Good asbestos has been found in considerable quantities farther west in Deloro Township.

The search for platinum in serpentine, olivine diabase, and peridotite might yield results if it were made systematic. While the discovery of placer platinum is not very likely in a country that has been so extensively glaciated, that it is possible is shown by the placer gold of Quebec province and of New Zealand. There is always the chance, too, of finding a paying quantity of this valuable metal in place. At $105 an ounce, very little would make a paying proposition.

THE "ANGLE SYSTEM"

In a paper on "Coal Mining in Alberta" presented at the Toronto meeting of the A. A. A. Sc., Mr. Jas McEvoy called attention to the rapid and steady increase in coal production in Alberta, which is equivalent to the addition of one new colliery producing 1000 tons a day each year for the past 18 years.

Mr. McEvoy in his paper gave an account of the mining of coal by the "angle system".

This system was developed in that portion of the bituminous area lying west of Edmonton, Alberta and was suitable only to thick seams which were high pitching, 60° or over from the horizontal being preferable, and which were free from or comparatively free from impurities.

The system cannot be adequately described in a short note but roughly outlined it is as follows:—

Driving a main and return entry in the ordinary way, then after leaving a sufficient protection near the front, driving up pairs of inclines or angles at 800 or 900 foot intervals on a slope of 30° from the horizontal. These are called "main angles".

From these main angles back angles are driven at regular intervals also in 30° slope, with cross-cuts between, all of which are driven on the floor of the seam, so as to block out all the coal above the return entry into pillars 40 to 50 feet square. Main angles and back angles are narrow ways, 7' x 9' or less.

In the main and back angles a chute is built at one side of strong boards or 2 inch plank lined with sheet iron and the coal is drawn out commencing at the bottom of the top row of pillars and allowed to slide down the chutes to the main entry.

For safety purposes and to control ventilation the mine is laid out in panels of 1200 feet or more running length, and a block of coal is left standing between the panels, whence there has been no extraction except what is taken out in driving a pair of upraises to the surface.

Mr. W. T. Rolfe, superintendent of the Creighton mine of the International Nickel Co., has been appointed superintendent of the Canadia Associated Goldfields mine at Larder Lake, succeeding Mr. Geo. Gray.

NICKEL "MOND" NICKEL
Analysis 99.8% Ni

99/100%
NICKEL ANODES (Rolled and Cast)
NICKEL SHEET and STRIP
NICKEL ROD and WIRE

NICKEL SALTS
(For Nickel Plating, etc.) 99 100%
COPPER SULPHATE 'Maple' Brand
(Powder or Crystals) 98 99%
THE MOND NICKEL CO., LIMITED
39 Victoria Street, London, Eng.

EDITORIAL

COURAGEOUS LEADERSHIP.

In the current issue of "United Empire," the journal of the Royal Colonial Institute, Mr. J. S. Little says:

> "The ball is at our feet. Huge territories await our sons and daughters to people them. Limitless resources ask for their brains and sinews to develop them. The English race, here in these islands, has increased from ten to forty-seven million souls in less than a century. What is to prevent its increase in the Overseas Dominions to proportions as undreamt of today as the increase of the English in these isles was undreamt of in the days of George III?"

The Hon. Wm. Sloan, Minister of Mines for British Columbia, said recently in addressing the Vancouver meeting of the Canadian Institute of Mining and Metallurgy:

> "It [optimism] is justified, I maintain, when we find a single mine producing 31,280,000 pounds of copper, the total of last year's output. Further confirmation is supplied by the fact that a single mine provided the 15,000,000 pounds of zinc that we produced in 1921. When we consider these facts and then reflect upon the vast extent of British Columbia's undeveloped and unprospected mineral-bearing zones, it is possible to realize something of the possibilities."

The mature judgment of Dr. C. A. Corless was given in his Presidential Address in Ottawa on March 1st. After mentioning that in the little corner of the pre-Cambrian shield that projects into Michigan and Minnesota there have been found the world famous copper and iron deposits, he continues:

> "On the Canadian side of Lake Superior, real prospecting in this vast pre-Cambrian area is scarcely begun. . . . And not only this, but continual discoveries in the partly prospected region are convincing evidence that even in this restricted area a mere fraction of the valuable metalliferous deposits has so far been discovered. Only rough prospecting has so far been carried out over a part of this smaller [explored] area. Scientific prospecting is not really begun. . . . . I have lived eighteen years in this great mineral region . . . . . In stating these gradually formed convictions, I am expressing what was at first merely a hope; what grew with study, observation and experience to become a probability; and what has finally grown with me to be a practical certainty."

On the same occasion, Dr. Charles Camsell, Deputy Minister of Mines at Ottawa, said:

> "Twenty-five years of exploring leaves me with a firm belief in the future of Canada's mineral industry. . . . As a people we have not shown the faith in the future of our mining industry that the conditions warrant."

These statements are not the ordinary opinions of the average writer or publicist; they represent the authoratative judgment of men in high position, each speaking about a field to which he has devoted special study, and in the case of the three Canadians, each basing his conclusions essentially upon personally observed facts. These now join their voices with those of Dr. W. G. Miller and kindred spirits—students for decades of the fundamental problems of our province—from coast to coast convinced of what [illegible] Land holds in store for us.

That these utterances come [illegible] when Canada, the Empire and the world are in the depths of a business depression, [illegible] In times of stress that leaders come to the fore. Our mineral industry has been hard hit. [illegible] and force of character feel a [illegible] themselves to exert directly in the public interest, [illegible]

that is ordinarily directed into other channels. In good times, optimists can be safely looked upon with suspicion, they are being carried along upon the wave of prosperity, and will very easily slip behind into the trough. The optimist in hard times is more likely to be a true prophet, as it takes the courage born of well-founded knowledge and firm conviction to oppose the tendency of the times.

When we are convinced that Canada's undeveloped mineral resources are worthy of the best efforts we can put forward to develop them, it still remains to put our resolution into effect. Action, not words, will be the final test of our conviction and of our good faith. It will devolve upon a multiple of prospectors, engineers, investors and miners to do each his part in making more tangible Canada's heritage of mineral wealth. When we analyze the situation, we find that it is essentially upon the man of initiative that the burden rests. There be many to follow, but who will lead? To the prospector that risks his time and effort; to the engineer that hunts out a good prospect and then stakes his reputation upon it; to the man of small means who "grub-stakes" a friend; to the capitalist that will chance failure in turning a prospect into a mine; to these men will Canadians of a future generation point as the pioneers in one of the world's great mining centres.

THE JOURNAL-PRESS.

The "Engineering and Mining Journal" of New York and the "Mining and Scientific Press" of San Francisco have joined forces. The combined journals will be published under the name "Engineering and Mining Journal-Press," with Mr. J. E. Spurr as editor. Mr. T. A. Rickard will be contributing editor, representing particularly the West.

These two journals are well known wherever mining is carried on. Each has served well the mining industry. There can be no doubt that the joining of forces will make possible the publication of a greater journal; but it was nevertheless with mixed feelings that we read the announcement. One new friend is poor compensation for two old ones, even though the new friend is known to combine the good qualities of both the old. On the other hand, there can be little doubt that the consolidation will permit the giving of a much improved service to the mining industry.

Mr. McGraw aims to make the Journal-Press the one great mining journal of the world. He indicates his plan for expansion with the object of keeping ahead of progress in the industry. He points out that both the Journal and the Press have international interests and that neither represents a section. The union will make possible the carrying out of plans that cannot be safely embarked on by either publication separately. A really great mining journal should result from the carrying out of these plans.

SILVER IN YUKON.

The mining history of the Yukon has been largely a history of placer gold mining. The Klondyke poured out its riches at an astonishing rate and brought to Canada's far northwest thousands of adventurous men. The flood has long since subsided, but a constant stream of gold continues to flow from the camps of the Yukon. Many of the men that were attracted to the country by the sensational discoveries of the early days have remained in the Yukon, and among them are many who believe that gold mining will continue for a great many years. During the last fifteen years production has been largely from deposits that were too low in grade for operations on a small scale. Huge dredges and hydraulic plants are at work on the creeks of the Klondyke. The two companies operating dredges near Dawson have already handled forty million cubic yards of gravel; but there is such a large area to be worked that the operations on these properties are expected to continue for at least twenty-five years longer. These dredge operations give the Dawson district a steady production. New discoveries in other districts help to swell the output. It is evident that placer gold mining will continue in the Yukon for many years yet.

That the Yukon has mineral riches other than gold is to be expected. Some of these have been discovered in recent years and during the past two years there have been developments indicating that silver mining is to be a big industry there. Silver ore of high grade will be shiped out this year from Keno Hill; one company has about 5,000 tons ready now. Two well-known gold-mining companies, Yukon Gold and Alaska Treadwell, are developing silver mines. Another Alaska company, Slate Creek Mining Company, has options on several properties. Notable discoveries were made during 1921 and several hundred claims staked. It is expected that there will be much activity in this new silver camp during the coming summer.

The most notable discovery on Keno Hill during 1921 was the location of the lode along the western slope of the hill. According to an account published in the "Dawson Daily News," the vein has been traced for nearly a mile and is five to fifteen feet in width. The shipping ore assays 200 to 500 ounces silver per ton. At four shafts there is about two feet of such ore, with lower grade on either side.

Development is steadily proceeding and it appears probable that production will be large and continuous. For some time the output will be limited, but a considerable quantity of the high-grade ore taken out in the development work will find its way to the smelters this year. The people of the Yukon may well be pleased with the prospect.

EDITORIAL NOTES.

The futile, useless and lamentable disturbances in South Africa have brought to the fore once again that signally efficient statesman, General Jan Smuts. General Smuts is a practical hero, a practical patriot, and a man as clear in thought as he is prompt in action. He recognizes the meaning of stable government. He sees that the British Empire is now a congeries of republics—in all but name. The name, he knows, is good for all time.

The announcement of the newly-appointed president of the Canadian International Nickel Company, Mr. J. L. Agnew, to the effect that all refining of nickel will be done hereafter in Canada, is one of the effects of post-bellum industrial readjustment.. It signifies more to our country than would appear on the surface. Statistically, it will greatly enlarge the money value of our mine products. As a demonstration of smelting economies, it marks one step toward the goal of a self-supporting Canada. There is much food for thought in this.

It is with vast relief that we feel ourselves justified in assuring our readers that our valued correspondent and mentor, Mr. Alexander Gray, is not guilty of a grave charge recently preferred against him. Very respectable verses (but still verses) appeared lately in a Montreal daily, signed "Alexander Gray." Our suspicions were aroused. We were bold enough to put the question direct to Mr. Gray. His denial of paternity was a trifle more than emphatic. The phrases used do not lend themselves readily to type in any country where even a casual censorship of the press is maintained. However, we have no remaining shadow of a doubt that Mr. Gray is *not* guilty.

PROSPECTS AND PROSPECTORS.

Elbow Lake, Manitoba.

An engineer fresh from the Elbow Lake discoveries gives a glowing account of the gold veins to be seen. He says the outcrop is both very rich and large. Its solid "chunks" of gold completely put in the shade the Dome's famous "Golden Stairway." It seems quite certain that the Hollinger syndicate, who have men at work on the Murray claims, will take up their option.

A New Copper Prospect

In Halifax township, Megantic county, Quebec there has been recently opened up a promising copper prospect. Stringers of copper oxides intersect a zone impregnated with the same oxides. A prospect shaft is being sunk in this mineralized zone. A small amount of stripping has been done, which indicates that the lode will continue for a length of several hundred feet at least.

To provide funds to prove and develop the property, the Quebec Megantic Copper Company, Limited, has been incorporated, and stock is being offered to the public. Senator Pope has been made president of the company. Competent technical advice has been obtained, and will be put into effect when funds are available.

The raising of funds for speculative development is at present extremely difficult. One consequence of this is that only a disproportionately small fraction of any sum raised is available for actual work on the ground. This is apt to impose on a prospect an undue burden, sufficient to nip in the bud a career of usefulness. It is a pity that the prevalent attitude of men with large capital makes it necessary for impecunious prospectors to adopt such means.

A Novel Grub-stake.

To provide funds for prospecting and for developing his prospects, Mr. Tom Saville of Sudbury, has organized the Mines Service Corporation, Limited, and invites subscriptions (at par) from the public. This veteran prospector (much older in experience than in years) has a reputation for square dealing that has lasted since the days of the Cobalt boom.

The gambling spirit affects us all more or less. Cards and dice are probably the least offensive of gambling devices, though they provoke the most censure. Race tracks cost the country a pretty penny each year and support a host of employees and hanger-on, with nothing much to show for the expenditure. "Flyers" on the stock exchanges provide, no doubt, pleasurable excitement for many thousands of honest citizens; but they might get a better return at less risk in a poker game.

If we must take a chance, why not take it in a way that involves a constructive effort? If money is made in the ways enumerated above, it involves a transfer from someone else's pocket. If money is made from the shares of the Mines Service Corporation, it will come out of the ground.

Mr. Saville deserves the support of the public in his effort to find and develop mines.

MUCK.

You take a shovel in your hand
And go up to the face;
The shift boss swears to beat the band,
You strike a hellish pace.

You lift, and bar, and load away
Until your back is broke,
Until your back is broke to stay
And then you take a smoke.

And this goes on for half a shift
Until it's time to eat,
And then again you load and lift
And once again repeat.

And so it goes for months and years
And get some geezer'll growl
Or weep most hypocritic tears
Or try to get us foul.

Because we like to hit it up
To drown our sodden sorrows—
Forgetting (sanctimonious pup)
The prospect of *our* morrows.

IVON.

The Modern Column Hoist

Its Construction And Use In Mine And Quarry Operation.

By F. A. McLEAN, Assoc. M. C. I. M. & M.

In proportion as men have applied machinery to their tasks, conserved their minds and nervous energies for constructive thinking and planning, and then applied their plans and ideas to the utilization of this machinery, have they made real progress.

Skilled labor is an asset only when its time is spent in doing the work which it alone can do; thus, not labor economy, but a proper distribution of labor turns losses into profit. The substitution of machines for men on temporary work and the odd hauling, skidding and hoisting jobs which are so often met in mine or quarrying operations, is therefore, highly desirable, as each time that an employee calls a fellow workman away from his allotted task, the firm that employs them is losing money. Furthermore, the use of manual labor for this kind of work is not only too expensive but often increases the danger of accident, since the men of one shift will have a tendency to shirk or leave the hoisting and hauling of the necessary timbers to the shift that follows.

Of the various methods of solving light hoisting, hauling and skidding problems that have been made available to the mine or quarry operator within recent years, none has done more toward the curing of these evils than the air-operated column hoist. Within the last few years these little machines have been introduced in coal and metal mines, quarries and industrial plants all over the world with remarkable success—and to any one who is not familiar with them, their versatility and number of possible applications is often surprising.

Description of a Modern Portable Column Hoist.

One of the best known hoists of this type, is the "Little Tugger" illustrated in Figure 1. The motive power of this hoist is provided by a simple engine using air or steam expansively and giving four power impulses per revolution, thus securing smooth operation; and as there are no dead centers it may be started in any position. The engine is readily reversed and is controlled by a small lever on one end of the drum housing. Pushing this lever forward raises the load and when it is thrown backward the load is lowered. The reverse can also be used as an auxiliary to the regular brake if desired. When the throttle lever is released, it is automatically returned to the central position cutting off the supply of air or steam and stopping the hoist. The control is very sensitive and the hoisting speed may be varied at will. Power is transmitted to the drum by means of a clutch and gears which are controlled by a clutch lever located on the end of drum housing opposite the throttle; cords may be attached to the control lever if desired, and the hoist controlled from a point some distance away. The gears are machined from steel and run in an oil bath which also lubricates the various bearings. The engine is lubricated by oil from a reservoir in the cylinder casting, and the drum bearings are supplied from a large oil cavity—in the centre of the drum—which has sufficient capacity to do away with frequent refilling. A "Raybestos" lined brake of the band type is actuated by a long lever attached to the base of the hoist and operates through the medium of a double-screw on which are cut both right and left hand threads. This arrangement permits the brake to stay in any position in which it is put either on or off without the use of ratchets, toggles or other complicated parts. The brake is adjustable for wear and the brake lever may be placed in the position most convenient for use in cramped or close quarters, for which this hoist is particularly well adapted, owing to the entire absence of all exposed moving parts or projections which might interfere with the operator in the dim or uncertain light underground. As the drum is mounted independently of the engine shaft, wear and friction from the brake band load are eliminated.

A very useful feature of these hoists is the clutch

Fig. 1. — Column Hoist.

mechanism, which enables one man to successfully operate the hoist on haulage work, as he can leave the hoist and carry the rope to the desired point, whereas, in hoists not fitted with this clutch, it is necessary to employ two men and pay the rope out under power—one man being required to run the hoist and the other to carry the rope.

These hoists are furnished in two sizes known as the 1-H and 5-H models. The smaller or 1-H model is furnished for use either with wire or manila rope and when equipped for the latter, is termed an 11-H hoist. Both sizes are built to operate either on air or steam. Machines intended for operation on steam are called Class 1-HS, 11-HS and 5-HS hoists respectively, have larger valve clearances than the Class H hoists and are fitted with lubricators and drain cocks. In all other respects, however, the Class H and HS, are practically identical.

The 5-H hoist develops 5 Horse Power and the 1-H machine 2½ Horse Power. The drum capacity of the largest hoist is 645 feet of ⅜" wire rope or 1,025 feet of 5/16" wire rope, that of the 1-H and 1-HS hoists 700 feet of ¼" wire rope or 450 feet of 5/16" wire rope and that of the 11-H or 11-HS hoists, 300 feet of ⅞" manila rope.

The 5-H and 5-HS hoists have a lifting capacity of 1,500 pounds at a rope speed of 110 feet per minute, the 1-H and 1-HS, 1,000 lbs. at 85 feet per minute, and the 11 H and 11-HS style 600 pounds at a rope speed of 85' per minute, or smaller loads at higher speeds, on a steam or air pressure of 80 pounds.

The hauling capacity of the 1-H and 1-HS "Little Tugger" on various grades is shown in the table in Figure 2. The haulage capacity of the 5-H and 5-HS hoist is about 50 per cent. more and that of the 11-H and 11-HS hoists about 40 per cent. less. The air consumption of the 5-H "Little Tugger" is about 300 ft. and that of the 1-H and 11-H Little Tuggers averages about 165 feet a minute when they are lifting their full loads at maximum rope speed.

Rise per 100	Angle of incline	Load including car
5 ft	2 deg. 52 Min	14,290 lbs.
10 ft	5 deg. 43 Min	8,330 lbs.
15 ft	8 deg. 32 Min	5,950 lbs.
20 ft	11 deg. 18 Min	4,630 lbs.
25 ft	14 deg. 03 Min	3,780 lbs.
30 ft	16 deg. 42 Min	3,260 lbs.
35 ft	19 deg. 18 Min	2,850 lbs.
40 ft	21 deg. 49 Min	2,550 lbs.
45 ft	24 deg. 14 Min	2,320 lbs.
50 ft	26 deg. 34 Min	2,140 lbs.
55 ft	28 deg. 49 Min	1,990 lbs.
60 ft	30 deg. 58 Min	1,870 lbs.
65 ft	33 deg. 02 Min	1,770 lbs.
70 ft	35 deg. 00 Min	1,681 lbs.
75 ft	36 deg. 53 Min	1,610 lbs.
80 ft	38 deg. 40 Min	1,550 lbs.
85 ft	40 deg. 22 Min	1,500 lbs.
90 ft	42 deg. 00 Min	1,450 lbs.
95 ft	43 deg. 32 Min	1,410 lbs.
100 ft	45 deg. 00 Min	1,370 lbs.
110 ft	47 deg. 44 Min	1,320 lbs.
120 ft	50 deg. 12 Min	1,270 lbs.
130 ft	52 deg. 26 Min	1,230 lbs.
140 ft	54 deg. 28 Min	1,200 lbs.
150 ft	56 deg. 19 Min	1,170 lbs.
160 ft	58 deg. 00 Min	1,150 lbs.
170 ft	59 deg. 33 Min	1,130 lbs.
180 ft	60 deg. 57 Min	1,120 lbs.
190 ft	62 deg. 15 Min	1,100 lbs.
200 ft	63 deg. 27 Min	1,090 lbs.

Fig. 2. — Haulage capacity of 1-H and 1-HS Little Tugger Hoists on various inclines.

The 5-H and 5-HS models weigh 475 lbs. the 1-H and 1-HS models 285 lbs. and the 11-H and 11-HS models 358 pounds. All types of these hoists require very little attention and can be quickly bolted to a column, pipe, timber, flooring, or any other convenient support that will hold the load, without the use of special tools or fittings. The 11-H hoist can also be obtained with a divided drum for balanced haulage, when so desired.

Column Hoists Speed Up Mine Timbering.

Pulling timbers from old workings is one of the fields in which one man with a column hoist can do as much as from two to six workmen by hand. At the Negaunee Mine in Minnesota, the system is top slicing and the ore is won in drifts running from a raise to footwall. The raise is driven upward from a main haulage level on an incline of about 20 degrees from the vertical and is sufficiently large to be divided into two sections, one an ore chute and the other a ladder road.

Timbers are hoisted up the ladder road for timbering drifts in the sub-levels, which must be closely and strongly timbered. The timber cannot be lowered from above as all of the area directly above the sub level is a mass of debris and caved material. The timber, in the face of these conditions, must be hoisted from the haulage level.

The old system required four men to hoist timber with a windlass; thus, two working partners were obliged to call two other men from their work to assist them with their timber. This provided an incentive for the men to work ahead of the timbering, so as to throw the job of timber hoisting on to the next shift. This was a dangerous procedure, owing to the necessity for strong timbering in this mine, as mentioned above, and the problem was finally solved by the use of a "Little Tugger" Hoist in the following way:

The hoist was clamped to mine timber posts placed back 10 to 12 ft. from the raise, the rope being passed through an iron pulley-block over the top of the raise and then dropped to the bottom to receive the load. One man now makes up the load at the haulage level and the other stays at the hoist.

Fig. 3. — Skidding Mine Timber

This makes a two man job, does the work much quicker and makes less work for two men than there formerly was for four, and in fact, so reduces the work of hauling timber that each shift now takes care of all of its timbering with added safety and satisfaction to all concerned. Thirteen of these little hoists are now used in the mine and the miners swear by them.

In many sections of the anthracite district, particularly where the coal beds are steep pitch, the rapid and economical movement of mine timbers into the upper workings presents a real problem. In such places the Little Tugger Column Hoist serves a double purpose—supplying the needed tractive power and furnishing air for ventilation.

In one section of the Catherine Colliery, the vein pitches 15½ degs. and the steady movement of timbers up such a steep slope seriously taxed the endurance of the men formerly employed on the job. A slope of 250 feet long connected two levels. Up this the timber was moved, and down it was discharged the coal extracted in the development of the upper level. The development of four rooms and two gangways required six mine car loads of timbers per day, and for carrying up these timbers by hand six men were constantly employed.

A 1-H Little Tugger Hoist was installed in rather close quarters at the head of the sheet iron lined timber chute (See Fig. 3.) Its 5/16 in. wire rope is pulled down into the lower level where one man attaches it

to the timbers on the cars. On signal to the hoisterman, the hoist pulls up from three to four timbers 14 ft. long with an average diameter of 8 to 10 inches. The ropeman rides the timbers to the upper level and returns with the slacked off rope. The timber is thus hoisted with the services of only two men, and these two men do in half a day the work which formerly required six men all day. The other four men are thus available where badly needed for getting out coal—so that the hoist really performs the equivalent of eight men's work per day.

As previously stated, the 1-H Little Tugger Hoist has a speed of 85 feet per minute in lifting a maximum weight of 1,000 lbs. vertically, but in hauling these heavy timbers 250 ft. up the slope it is a little slower, so that 5 to 6 minutes are required for the round trip by the ropeman.

When not employed for timber hauling, the hoist is used to haul coal in a one-ton buggy from the face of the level along a slight grade to the rocker dump at the head of the chute. Scores of these hoists have been installed in the mines of the anthracite district and are used for a wide variety of purposes besides timber haul-

Fig. 4. — Hoisting muck in a winze with hoist clamped to stretcher bar.

ing, such as, for instance, the hoisting of rock in buckets from shallow shafts, the hoisting of tools and men into raises, and even pulling 40-ton capacity empty coal cars up a slight grade to a loading position beneath the discharge chutes of a breaker.

Column Hoists Solve Many Haulage Problems.

In driving a rock tunnel to connect with a shaft, at another large colliery, it was desired to use the 108-cu. ft. capacity cars which were used about the mine to carry the rock mucked from the working face. The tunnel was about 300 ft. long and had only a slight grade, except at one point where for about 50 ft. the track was given a grade of 10 per cent. The cars when loaded with rock weighed about 12,000 lbs. and to pull them up the 10 per cent. grade, three 1-H hoists were installed.

The concentration of three separate hoists pulling three ropes attached to one heavy car, is of course, un-

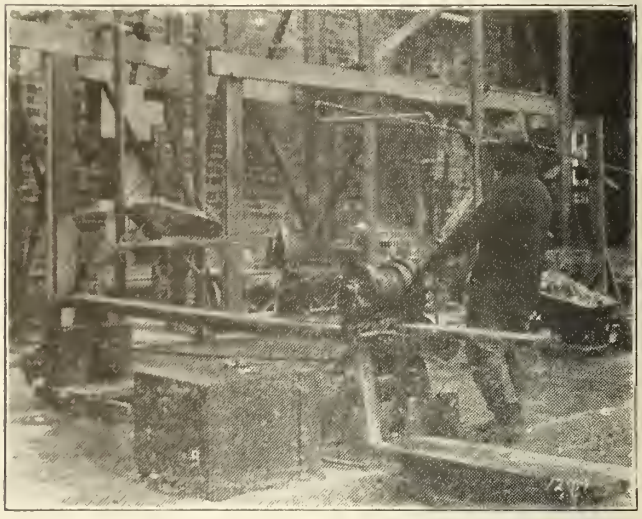


Fig. 5. — Hoisting brick with a Little Tugger Hoist.

usual and would not often happen except in emergency cases or for temporary work. This installation serves to illustrate, however, the wide adaptability of these machines, and the possibility of using them to tide over a situation where the delivery of a larger and more powerful single hoist would seriously delay urgently needed production or development.

Column Hoists a Convenient Source of Portable Power Underground.

Many needs for portable power have been met by these little hoists on account of their compactness, ease of installation and operation. Hauling cars in and out of small drifts is a common application, and in sinking prospect shafts these hoists have been used to handle nearly everything, as the little two-drill compressor commonly used supplies plenty of power for hoisting when the drills are not working. In the larger sinking operations these hoists have been used to handle sinking pumps; for hoisting the drilling machines before shooting, and to put piping, conduits, etc., in the

Fig. 6. — Hauling Rails through a rail bender with a Little Tugger Hoist.

shaft. In winzes and raises they handle drills, steels, powder, timbers and muck. (See Fig. 4.).

As auxiliaries to the regular mine hoists needed in the larger winzes, column hoists have proved labor savers in bringing the rope back to the bottom which, when done by hand requires the work of several men.

The Alabama red o e mines employ column hoists in drifts where the grade is too steep to push an empty car by hand or to haul it with a mule, and where the

Fig. 6a. — Hoist arranged for hauling rails through benden.

down grade is not sufficient to keep the cars moving by gravity. In some of the Michigan Mines where it is necessary to move the tram cars on 30 degree slopes between levels, hauling up empties and lowering loaded cars is efficiently done by these small machines which handle some remarkable loads.

To prevent the flow of water into an Arizona mine, holes were drilled to bed rock and slime was pumped in under pressure. This slime "set" like cement and it was found that a portion of the faults could be filled up and the pumping costs consequently reduced. A drilling rig similar to a churn drill, was used, the actuating power being a Little Tugger Hoist. The string of 3-in. tools was raised by the hoist and allowed to drop of its own weight and by this method 30-ft. holes were sunk at a fair rate of speed.

Fig. 7. — Changing stamp mill shoes with a column hoist mounted on a small truck.

Column Hoists Have Numerous Uses on the Surface.

The uses of column hoists above ground are, if anything, even more varied than underground, and range all the way from removing dirt from a foundation excavation or raising brick and mortar, (See Fig. 5) to driving a tumbling barrel by belt from the rope drum. In the latter case, drill steel is tumbled to clean it for electric welding. At an Alaskan mine, a Little Tugger Hoist is used for hauling large logs from the water up the beach to the lumber pile, and then to pull the logs along in front of a saw, and at another mine, all the fuel oil and supplies are hauled up an incline tram with a column hoist, as labor is too expensive.

Rail bending is not an infrequent requirement in mine track work, and the usual method of cranking the rails through a rail-bending machine, is generally a slow, back-breaking job. At one of the Juneau (Alas-

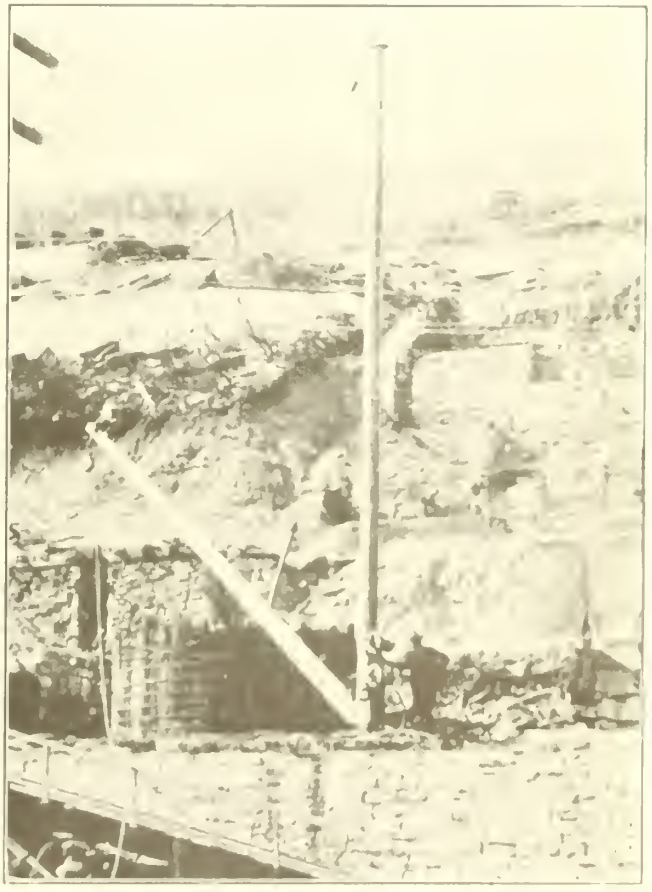


Fig. 8. — Tugger Hoists used for "powerizing" a derrick, one hoist is used for hoisting, and the other for swinging.

kan) mines, fifty pound steel rails were being bent by hand with a three wheel hand power bender when the idea of using an air operated Little Tugger Hoist to pull them through occurred to the Superintendent. The rail bender was therefore, fastened on the track at a point where the curvature was approximately the same as that of the rails to be bent and the hoist placed a little over a rail's length away. The rails were then started through the bender and the hoist pulled them the rest of the way. The power required

was, of course, considerable and when a curvature of short radius was required a block and tackle was sometimes employed to increase or multiply the pulling power of the hoist.

When cranking the bending machine by hand, eight men were able to bend but eight rails a day. With the assistance of the "Little Tugger" two men bent six rails per hour, the other six being kept busy carrying them to and from the machine. As shown in figure 6, the hoist is bolted to a timber skid which enables it to be quickly anchored in any place desired.

At a mine in Cuba, two of the hoists were placed on a locomotive and used to haul cars in and out of sidings to save switching the locomotive itself. This, however, would not be practicable in many cases. A 1-H Little Tugger Hoist bolted to a small flat car is used by a Western mine for all sorts of odd jobs, such as erecting and repairing machinery, changing stamp mill shoes, etc., (Fig. 7,) and at a mine on the Great Lakes, a Column Hoist bolted to a post is used for shifting heavy boxes and parts of machinery in the store room, unloading cars, etc.

These hoists are also used quite extensively for "powerizing" hand derricks. In the installation shown in Fig. 8, two hoists are used, one for the hook and the other actuating the boom, although, as a rule, only one hoist is used.

(To be continued.)

The Mining Outlook In Northern Manitoba.

By REECE H. HAGUE.

Never since Northern Manitoba first attracted attention as a potential mineral producer has the outlook of the industry in the district been so bright as it is at present. The past twelve months have seen more large mining corporations become interested in the district than ever before, and indications would point to considerable activity in the mineral belt during the coming summer. The hopes of residents are high that their long period of waiting is at an end, and that Northern Manitoba will soon take its place among the big producers of the country.

A year ago the Mining Corporation of Canada took over the Flin Flon property in the Schist Lake area, making a substantial payment to the owners. It is now understood that this company intends to carry on further exploration work during the summer. The exact nature of the work to be done has not been stated, but it is understood that it will include the diamond drilling of claims recently acquired, adjacent to the proven ore body.

Approximately $750,000 has been spent on the Flin Flon property in diamond drilling, sinking and drifting since its discovery, and an ore body of tremendous size has been proved. Values have been found to be consistent, and sufficient ore is in sight to enable a smelter with a 2,000 ton daily capacity to operate for more than 30 years.

At the time the Canadian Mining Corporation took over the Flin Flon, copper was at an almost unprecedentedly low figure, and mines were closing down all over the continent; so this powerful corporation must have felt great confidence in the property to purchase at such a time.

Work is in progress on the Murray claims at Elbow Lake, and sufficient supplies have been taken in by freight teams this winter to provide for a large force of men all summer.

Numerous sales of claims are reported in the Elbow Lake and Claw Lake districts, and it is anticipated that the spring will see a large influx of prospectors and mining men into that area.

Walter A. Rukeyser, a mining engineer from New York, who recently visited Elbow Lake, spoke highly of the district in the course of a recent article in the Mining and Engineering Journal, New York. The district was described as another Porcupine. Mr. Rukeyser optioned a number of claims for the British Exploration Company, not only at Elbow Lake but in the Lake Athapapuskow region, where he secured two large sulphide bodies.

The advent of the Nipissing Mining Company of Cobalt into the district has attracted wide-spread interest. This organization secured 14 claims at Copper Lake from J. P. Gordon and intends to spend $100,000 on exploration work on the property next summer. Mr. Gordon's claims were staked two and a half years ago and are situated some eight miles from the scene of the Murray find at Elbow Lake. During the winter following the discovery Mr. Gordon spent $50,000 in diamond drilling a huge quartz dike that occurs on the property, and got favorable assays in gold.

W. Lee Heidenreich, engineer for the Nipissing group, arrived in The Pas recently and will take charge of operations at Copper Lake. Supplies are at present being sent out by freight teams, and a diamond drill belonging to Smith and Travers of Sudbury is on the way to the property. An assay laboratory will be established on the ground in order that drill core may be tested without delay. It is the intention of the Nipissing Company to drill a large sulphide body that occurs on the Gordon claim, and also to employ a number of men in general exploration work.

With such companies as the Nipissing, the British Exploration, the Mining Corporation of Canada and interests associated with the Hollinger, all displaying interest in Northern Manitoba, and intending to do considerable development work, it seems safe to assume that the critical stage in the development of the district has passed. Lack of transportation facilities is the principal difficulty under which the district is laboring at present, but there is every ground for belief that railway communication will soon be established between The Pas and the mineral belt.

Eighteen months ago the Manitoba Provincial Government conducted a preliminary survey of a proposed railway route to Flin Flon, which will connect up many of the important properties in the district and will provide direct water communication with Elbow and Copper Lakes. It is hoped locally that construction of this line will be commenced within the next few months, when a great impetus will be given to mining generally in the locality and intensified prospecting of outlying portions of the mineral belt will be hastened.

British Columbia Letter

Stewart, B.C.—The newly installed tramway of the Premier Mining Company has been operating satisfactorily, 120 tons of ore being brought to the seaboard every eight hours. The ore is graded at the bunkers, that containing the lesser values being deposited in an ore bunker for shipment to the smelter at Anyox, while the higher grade is shipped direct to the Tacoma Smelter. There are yet some details to be completed in connection with the tramway system, but these are of minor importance.

The Company intends to construct this summer a number of houses for the use of married men in their employ. An assay office is being built next the cyanide plant, and in this will be installed a plant for the conversion of precipitates into bullion. This will not be pure gold bullion, as it will contain all the minerals that are in the Premier ores. As soon as this equipment is complete, the shipment of the product will commence and it will be the first bullion ever sent from the Portland Canal Mining District.

Reports from Bitter Creek are to the effect that the L. L. and H. claims are showing up well on development. A tunnel has been driven about 15 feet and still is in ore. New work on what is known as the second lead has proven it to be at least 60 feet wide, carrying gold and silver values.

Granby.

Anyox, B. C. — Operations of the Granby Consolidated Mining & Smelting Company's smelter have been impeded for a week or more owing to lack of water, which of course has reduced the power available. The water shortage was caused by excessively cold weather resulting in the freezing of the creeks of the district. Only one furnace was in operation for a period. It is with a view to avoiding the possibility of the smelter being affected by cold weather in the future that the Company has decided to construct a 25,000 foot-acre reservoir during the coming summer. More than 900,000 tons of ore were smelted last year by the Granby Company.

Drilling for Oil at Kitsumgallum.

Hazelton, B. C. — Considerable activity is expected in the way of oil drilling in the vicinity of Kitsumgallum Lake as soon as weather conditions permit. Arrangements have been made by the Imperial Oil Company, it is reported, as well as all other interested concerns, for the sinking of bore holes in this District.

While on the subject of oil prospecting it is interesting to note that three carloads of casing and drilling supplies have arrived at Spirit River from the Imperial Oil Company and are being transported over the snow to Ponce Coupe.

Increasing Lead Refinery Capacity.

Trail, B. C. — That the lead surplus of the Canadian Consolidated Mining & Smelting Company has been sold out, that the smelting costs of the treatment of eastern British Columbia silver-zinc ores now are so low that the Company can fearlessly compete with the world in the production and sale of lead and zinc, and that the lead refinery at Trail is to be enlarged from a capacity of 90 tons to 150 tons a day, were statements made by Mr. J. J. Warren, President of the Company, at the recent annual meeting of the Associated Boards of Trade of Eastern British Columbia.

This meeting took place at Nelson. It was attended by many of the mining operators of the Kootenay Districts, as well as by business men representing those sections of the Province. Mr. Warren, who has just returned from the East, could not have made announcements more enthusiastically acceptable. The opinion was expressed on all sides that this indication of a new and progressive policy on the part of the Company would have an immediate and a beneficial effect on the mining industry of the Canadian West. Mr. L. H. Biggar, Manager of the Ottawa Mine, was one who gave expression to the general feeling of gratification. As a small operator, he appreciated what had been done and what was projected, and predicted that there would be important results.

Mr. Warren's Address.

Mr. Warren's address opened with some generalities. Amid laughter he observed that he was just back "from the centres of intelligence." Getting back to the Kootenay was indeed getting back home, for he had the kindliest feelings for the people of the Kootenay and the Okanagan, notwithstanding certain criticisms that were raised against the smelter, some merited perhaps, some unmerited, and some mischievious. The smelter had been smelting ores for a long time, and doubtless it would smelt them for a long time in the future, and such esteem as the smelter would ultimately obtain would be what in the long run it would deserve. After referring to conditions in Eastern Canada and on the Prairies, Mr. Warren said that the selling price of British Columbia's products was not so important as the production costs. The thing to be done was to keep production costs down. British Columbia did not fabricate in the sense that the Eastern Provinces did. Its products were more in the nature of raw materials—metals, lumber, fish and agricultural products. There was not sufficient population locally to absorb its output, so that the Province must export and the cost must be kept down. Anything that would reduce costs would aid. It was no secret, Mr. Warren said, that a year ago the Consolidated was in a very anxious position, like many other concerns. Its bank credit was poor. It had large stocks of metals on hand, the market was low, and there was a very small demand. It was in a position of anxiety, and had to consider whether it should close down, or should carry on.

He would have the people of Kootenay believe that what influenced the decision most was not whether the shareholders should make money or lose it, but what would be of effect on the district if the smelter carried on or closed down. The decision was made to carry on for another three months, even though it meant piling up more stocks.

Following this decision, Mr. Warren said he himself made a journey to China and Japan, perspiring in July and enduring all the perfumes of the oriental cities, to see if those countries could be induced to buy more lead. He arranged agencies to handle the company's products, and largely as a result of this, not only was it a case of the Consolidated not having much metal on hand, but it was completely sold out of lead, and was now in a position to carry on its operations in competition with the whole world.

This accomplishment was a credit to the company's operating staff, he said, which staff had done the greatest metallurgical work of a year ever known.

Admitting that he preached [illegible] Mr. Warren said the Consolidated had first practised what

be now preached, for it had cut the costs of production of lead and zinc to such a point that it did not fear any competition whatever. Lead and zinc were down in price, but in spite of that, owing to the progress made in treatment, the company would be able to sell them at enough to keep going.

On account of the large production of lead ore by the company, and of what would be forthcoming from private shippers, the lead refinery, now of a capacity of 90 tons a day, was insufficient, and the directors had authorized an increase to 150 tons a day. The company would then produce about 15,000 tons of refined lead per annum.

An Epoch in B. C. Mining.

Mr. Warren said the Consolidated had found a way by which it could accept shipments of zinc-silver lead ores, paying shippers a reasonable sum for the metal contents of all three ores. Formerly the zinc operated as a penalty. In a short time the company would be able to take care of the zinc, and give full value for it.

"This marks an epoch in British Columbia Mining," he declared. Some criticized the company for not having done this before, but as a matter of fact, the Consolidated had spent $3,000,000 in developing its zinc process, and it was too dangerous to vary the feed even slightly until the process was better under control. What the company was now preparing to do for the shippers of zinc ores was only the start. As the process improved, as it certainly would do, the company would give the shippers further benefits.

If the operators would stop talking about what the government should do for them, and rely on themselves, the Kootenay would have a prosperous mining industry. Any assistance that the smelter could give to the shipper or the prospector would be cheerfully given, he declared, provided that no paternalism was expected.

Duties on Minerals and Metals.

A number of questions relating to the mining industry of the Province were discussed at the recent annual Convention of the Associated Boards of Trade held at Nelson, B. C. Resolutions were passed asking for "adequate duties on all base metals entering Canada up to the point where metals can be supplied by Canadian products"; and advocating adequate duties on "copper rods, copper wire bars, zinc sheeting, sulphate of lead and fluorspar." Regarding fluorspar Mr. F. W. Bingay of the Consolidated said that Canada imported that article both from England and Kentucky, that Eastern manufacturers using that product have plentiful supplies in Ontario to draw from and would not be injured. It also was urged by resolutions that "The same duties on scrap copper, zinc and brass be imposed, as upon the virgin metal." The Colliery Companies, it was decided, would be petitioned to take steps to reduce the prices of coal and coke by every possible means at the earliest possible date.

All told, Trail sold only 350 tons of lead in Canada in December, and about 360 tons in January, while in each of those months it produced 2,700 tons. This showed how much of a market there was here for lead. So far as lead bullion went, the only Canadian purchaser was the Consolidated company, and it would be a funny proposition for a shipper to send his ore south to be smelted and then bring the bullion back to sell to Trail. What he would make by this traveling would not be very much.

Mr. Warren stated that Trail was increasing the capacity of its lead refinery and was reducing its rates. It has been accused of shutting down the Slocan, whereas the fact was it had never refused a ton of ore. When the company arrived at the stage where it could secure no more credit, it notified the shippers that it would advance the freight, and would stand the smelting charge, but that the shipper would have to pool his ore with that of the company and receive payment when it was realized on.

As soon as credit got easier, the company met the shippers in conference and arranged to pay them cash for their ore.

A couple of years ago an inquiry was asked for and granted and after the auditors went over the company's books they gave it a certificate of character that one would think would be appreciated.

Referring to criticisms of the smelter from a certain source, Mr. Warren said the Consolidated had to find $500,000 a month for its operations, and did not have time to chase every dog that barked at it.

L. H. Biggar said he wanted to be recorded as against the proposal, which he believed detrimental to the interests of Canada. On the matter of the treatment of shippers by the smelter, Mr. Biggar said the small shippers fully realized that it had been a matter of bank credit, and not of a desire to close them out.

The resolution was laid on the table.

A resolution from the Northwest Mining Association in convention at Spokane, asking support for reciprocal free re-entry of lead bullion to the country of its origin, was almost unanimously opposed. This was offered by the Nelson Board of Trade, although not endorsed by that Board.

F. A. Starkey of Nelson thought that the proposal was intended chiefly to benefit the smelter at Kellogg, Idaho. There were as good facilities at Trail as at Kellogg for smelting. J. K. Hunter did not think that there was much chance of the United States sending ore here to be treated.

Receipts At Trail.

Ore receipts at the Trail Smelter of the Consolidated Mining & Smelting Company for the third week in February totaled 6,395 tons. Of this, 6,276 tons came from the Company's mines, 37 from the Ruth, 43 from the Silversmith, 13 from the Trail Mining Company, and 26 from the Wind Pas, Chu Chua. This brings the total for the year to date to 61,690 tons.

Although Mr. J. J. Warren, President of the Consolidated, did not so state before the Associated Boards of Trade, it has been authoritatively announced that the Company will construct a small plant for the handling of the silver-lead-zinc ores of the Slocan and other districts. This will be entirely distinct from the plant now in use chiefly in the treatment of ores of the Sullivan Mine. It is expected that the Company will be able to accept zinc-silver concentrates from the custom shippers on or about the first of June. This equipment will be of special benefit to the operators of the Slocan. The Slocan Mines, it may be explained, produce two classes of concentrates: lead-silver, containing some zinc and known as lead concentrates, and zinc-silver, known as zinc concentrates. The lead-silver concentrates have been shipped to Trail, but there has been no outlet for the zinc concentrates. The latter, therefore, have been piling up and it has been a problem of concern to all interested in mining to find an economic method for their treatment. That this is to be taken in hand by the Company is gratifying news to all those affected.

Florence Silver.

Nelson, B. C.—A contract has been entered into by the Florence Silver Mining Company to supply the Pacific Color Company at Chilliwack with a supply of concentrate containing not less than 60 per cent lead. The first shipment the Color Company received contained 67 per cent lead, 8 per cent of iron and 3 per cent zinc. The Color Company expects to consume about five tons of concentrates from which it will produce a variety of pigments.

Silversmith.

The gravity section of the Silversmith Company's Ivanhoe mill is now running at full capacity, and the flotation section will soon be in operation. During January the company shipped 350 tons of concentrate to the Bunker Hill and Sullivan smelter, at Kellogg, and in future it is expected that not less than 400 tons will be shipped monthly. The average tenor of the concentrate was 67 per cent lead and 106 ounces of silver per ton. When the flotation plant is completed, it is expected that the grade of the concentrate will be markedly improved. An immense body of ore has been developed in the mine. The oreshoot has an average width of 7 feet and a length of 450 feet, and it is being mined on three levels.

High-Grade Silver Ore.

Grand Forks, B. C.—Some high-grade silver ore has been opened up on the Bell Mine and the Sally Group of claims, both of which are situated on Wallace Mountain near Beaverdell. The Bell is owned by Duncan MacIntosh, and the Sally by a Penticton syndicate. Mr. P. B. Freeland, Resident Mining Engineer, has been over the showings and his report is very favorable. Samples of the ore show as high as 6,000 ounces silver to the ton.

Cedar Creek.

Lillooet, B. C.—The freighting of machinery and supplies to Cedar Creek, where considerable placer mining activity is expected to develop this year, has been interfered with by heavy snowfalls in the Cariboo District. Much freight has been housed temporarily at 150-mile house. Freighting will be resumed as soon as weather conditions permit.

Vancouver, B. C.—The new claim which the Britannia Mining Company began to operate after the flood of a month or more ago is reported to be producing some extremely high grade copper ore. Assay returns run as high as 22 per cent. No shipments of this ore have yet been made, owing to the fact that the company's plant has not yet been restored. The claim in question is the Victoria, and it lies two miles farther east than any property yet worked by the company. It is on the east side of the mountain, and is approached by a tunnel from the older workings.

Arrangements are being made by the Tatlayoco Lake Gold Mines, Ltd., to ship a concentrator to their mining property, which is situated at the south end of Tatlayoco Lake. It will be transported over the Pacific Great Eastern Railway, and thence by Government wagon road for 150 miles. Considerable development work with satisfactory results has already been done on these claims, it being estimated that $75,000 has been so invested. An equal amount is to be expended on the mine plant and other necessary equipment.

Testing Iron Ore.

Victoria, B. C.—S. P. Silverman, President of the Tidewater Copper Company, Sidney Inlet, Vancouver Island, is quoted as stating that a Sheffield steel firm and the Krupp interests of Germany are testing samples of magnetic iron ore from his company's property, in order to ascertain whether the quality of the product would warrant its shipment to Europe for use in the manufacture of steel. He says that this ore contains a large percentage of molybdenum, nickel and manganese. At present the iron ore is being cast aside, but if markets can be found for it in Europe, shipment can be made at the rate of 3,000 tons per month.

KENO HILL SILVER.

The most notable strike on Keno Hill, center of the Yukon's greatest silver activity, made during 1921 was the finding of the lode on the west end or McQuesten slope of the hill. The vein starts at timber line and has been traced along the hillside through the deep moss and trees practically a mile, and ranges in width from five to fifteen feet between the walls. Numerous crosscuts have been made on the lode at frequent intervals for almost the entire length, revealing the ore in place at every point tapped. The discovery claim, the Ladue, at the north end of the lode, was found by David Cunningham and Ray Stewart, pioneer Yukon prospectors. A buckboard turned up a piece of float half a mile away and Joel Sunderland there found the vein on the Friendship claim. Other lucky stakers and owners on the lode were James Clark and Frank McNeill, while Raoul Binet and Dick McGuire were given one of the claims. All have bonded the ground for $40,000 to $65,000 a claim. A year ago one of the claims was offered in Dawson for weeks for $200, with no takers. The ore assays 200 to 500 ounces in silver to the ton. The claims crossed by the lode are the Ladue, the Bluestone, the Friendship and the Sadie. They were staked in the spring of 1920. Several adjoining claims also have been bonded to same companies.—Dawson Daily News.

A NOVEL CANADIAN INDUSTRY.

The Pacific Color Manufacturing Co. which was organized a year ago to develop the patents of H. D. Swartout, has brought the first unit of its plant at Chilliwack, 70 miles east of Vancouver, B. C., to the producing stage. The process that the company employs for making pigments consists of dissolving galena in dilute nitric acid contained in cast iron retorts, of special design heated by steam. The resulting nitrate of lead is drawn off into vats, where the lead is precipitated in different forms by various reagents, giving the desired pigments, while the oxides of nitrogen and any nitric acid that distills over are recovered. The insoluble residue is drawn off from time to time through valves at the bottom of the retorts. The patents cover reagents, temperatures and retort design.

The galena is obtained in the form of concentrate from the Florence Silver Mining Co., which is operating a silver lead mine at Ainsworth, in West Kootenay. The contract with the mining company calls for a concentrate containing not less than 60 per cent of lead. The first carload delivered contained 67.8 per cent of lead, 8 per cent of iron, and 3 per cent of zinc. The company is using 5 tons of concentrate daily, but expects during the next few months to install another battery of five retorts, which will double its output. Nitrate solution after the precipitation of the lead sulfate will be evaporated and sold for fertilizing purposes.—Chem. & Met. Eng.

News and Comments.

By Alexander Gray.

MINING ROYALTIES HIT PRAIRIE PROVINCES.

Regulations by Order-in-Council at Ottawa fix the royalty collectable by the Dominion Government "on the sales of the products from quartz mining locations on Dominion lands" on the basis of 2½ per cent. on such sales.

Accompanying this announcement is the explanation that "in order that investors may be aware of the extent of their liability in this connection, a scale of values has been laid down as follows: Gold is valued at $15 an ounce, royalty 37½ cents an ounce; silver valued at 60 cents an ounce, royalty 15 mills an ounce; copper valued at 12 cents a pound, royalty 30 cents a hundredweight; zinc valued at 4 cents a pound, royalty 10 cents a hundredweight; lead valued at 4 cents a pound; royalty 10 cents a hundredweight."

Presumably this is the forerunner of the transfer of mineral resources to the Prairie Provinces. No doubt the Dominion Government has exercised forethought; yet it is characteristic of the merely casual nature of public interest in such matters that the action has evoked little or no comment. It is not of public record that anyone identified with mineral industries was consulted. The sales tax imposed would not be burdensome were it the only levy. Considering that there are Provincial and Dominion income taxes, and in view of the fact that Alberta and other northwestern sections are deeply concerned with new and promising prospects, the regret is that such orders are formulated without discussion with investors and mining authorities. Manifestly the tax is invidious, in that it affects only Dominion lands located in areas where mines like the Flin Flon, and properties like those at Elbow Lake and vicinity, are undergoing development.

A NATIONAL ASSET.

What a large gold mine means to merchants, manufacturers, wage-earners and governments, to say nothing of shareholders, was illustrated by President Noah A. Timmins of Hollinger Consolidated at the annual meeting. To date Hollinger shareholders have received over $17,000,000. Mr. Timmins pointed out that to the end of 1921 the company had paid $27,420,185 to the people of the Dominion and Ontario, other than shareholders, in order to develop and equip their properties. This, of course, includes power, labor and supplies. Moreover, all but about $1,000,000 of the total was spent in behalf of Canadian labor and products. Mr. Timmins emphasized the possession of $6,042,794 in government securities, cash and materials. Taking the total of dividends and adding what is really cash in the treasury, the company dividends and money in hand are equivalent to $23,042,794, compared with the issued capital of $24,600,000. Therefore, Mr. Timmins was very much in order when he discussed the relationship of the gold industry to the public purse. Last year it cost the Hollinger Company $4.87 to mine and market the gold produced from each of the 1,072,493 tons milled. That was the dividend accruing to those supplying labor, power, machinery, and supplies, and to the governments. The shareholders received $2.98 per ton in dividends, and the speculative investment underground was maintained to the satisfaction of all concerned, the solitary dissentient holder being the late general manager, Mr. P. A. Robbins, who demurred at the policy of producing so much gold when costs and taxes were so high. That Mr. Robbins did not voice the Canadian view, and that his economics got twisted when departures from his policy were made, goes without saying. President Timmins made the admirable rejoinder that the company recognized the greater worth of their gold when out of the ground than when in place. Besides, it was more patriotic to mine and mill to the maximum possible in the circumstances while the country needed the money, and labor the employment.

INTERNATIONAL NICKEL OF CANADA.

John L. Agnew has been elected President of the International Nickel Company of Canada. As such he will coordinate the work of the Canadian organization with that of the New Jersey corporation, presided over by Mr. Stanley. Treasurer James L. Ashley also becomes a Director of the Canadian corporation, and Mr. Fred. S. Jordan is a new vice-President. Those veterans, in conjunction with Mr. Britton Osler, Wm. Wallace Mein and their colleagues, sustain the confident expectation that Canada will have the fullest measure of activity and efficiency in bringing the nickel industry to restored prosperity. The selection of Mr. Agnew to be chief executive at Copper Cliff, with jurisdiction over the Port Colborne Refinery, is specially acceptable to all who appreciate the magnitude and importance of International enterprises. He can be "hard-boiled" or "bonhomme" at will. These are the pre-requisites to the superintendence of the largest factor in the nickel industry.

Northern Ontario Letter

THE GOLD MINES.

The new hydro-electric development is being pushed rapidly by the Northern Canada Power Company. In spite of this, it has been stated here this week that the Hollinger Consolidated Gold Mines has appealed its case against the power company for damages of almost two million dollars. It has also been stated officially by Mr. Noah Timmins, president of the Hollinger, that the company is still endeavoring to secure the right to develop hydro-electric energy on the Abitibi River. This threatened continuation of litigation and this endeavor of the Hollinger to secure a power site of its own cannot be interpreted in any way as being detrimental to general progress, unless it should result in discouraging the Northern Canada Power from going ahead with further power development pending the outcome of the litigation. As to this, the recent decision appeared to be so completely in favor of the power company that this concern has seemed to feel secure, hence the present rapid progress being made in con-

The Canadian Miners' Buying Directory.

Acetylene Gas:
Canada Carbide Company, Ltd.
Prest-O-Lite Co. of Canada, Ltd.

Acetylene Welding:
The Toronto Iron Works, Ltd.

A.C. Units:
Powley & Townsley, Limited.

Agitators:
The Dorr Co.
Can. Chicago Bridge & Iron Co., Ltd.
Horton Steel Works, Limited.

Air Compressors:
Bellies & Morcom, Ltd.
Laurie & Lamb
Sullivan Machinery.

Air Hoists:
Canadian Ingersoll-Rand Co., Ltd
Mussens, Limited.

Air Receivers:
The Toronto Iron Works, Ltd.

Alloy and Carbon Tool Steel:
Peacock Brothers Limited.

Alternators:
MacGovern & Co

Aluminium:
Spielman Agencies, Regd.

Amalgamators:
Northern Canada Supply Co.
Mine and Smelter Supply Co
Wabi Iron Works.

Antimony:
Canada Metal Co.

Antimonial Lead:
Pennsylvania Smelting Co

Assayers' and Chemists' Supplies:
Dominion Engineering & Inspection Co
Lymans, Limited
Mine & Smelter Supply Co.
Pennsylvania Smelting Co.
Stanley, W. F. & Co., Ltd.

Ash Conveyors:
Canadian Link-Belt Company

Ashes Handling Machinery:
Canadian Link-Belt Co., Ltd

Assayers and Chemists:
Milton L. Hersey Co., Ltd
Campbell & Deyell
Ledoux & Co.
Thos. Heyn & Son
C. L. Conetant Co.

Asbestos:
Everitt & Co.

Balls:
Hull Iron & Steel Foundries, Ltd
Peacock Brothers Limited.
The Wabi Iron Works.
The Hardinge Conical Mill Co
The William Kennedy & Sons, Ltd.

Ball Mills:
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd
Mine & Smelter Supply.
The Wabi Iron Works.

Babbit Metals:
Canada Metal Co.
Hoyt Metal Co.

Ball Mill Feeders:
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd
Mine & Smelter Supply.

Ball Mill Linings:
Hardinge Conical Mill Co
The William Kennedy & Sons, Ltd
Peacock Brothers, Limited
Hull Iron & Steel Foundries, Ltd
Mine & Smelter Supply.

Balances — Assay & Analytical:
Mine & Smelter Supply.
The William Kennedy & Sons, Ltd

Belting—Leather, Rubber and Cotton:
Canadian Link-Belt Co., Ltd.
Northern Canada Supply Co
Jones & Glasco.

Belting:
R. T. Gilman & Co
Gutta Percha & Rubber, Ltd

Belting—Silent Chain:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal.
Jones & Glassco (Regd)

Belting (Transmission):
Goodyear Tire & Rubber Co

Belting (Elevator):
Goodyear Tire & Rubber Co

Belting (Conveyor):
Goodyear Tire & Rubber Co
Gutta Percha & Rubber, Ltd.

Bins and Hoppers:
The Toronto Iron Works, Ltd.
Can. Chicago Bridge & Iron Co., Ltd.
Horton Steel Works, Limited.

Blasting Batteries and Supplies:
Canadian Ingersoll-Rand Co., Ltd
Mussens, Ltd.
Canadian Explosives, Ltd.
Powley & Townsley, Limited.

Bluestone:
The Consolidated Mining & Smelting Co
The Conlagas Reduction Co., Ltd.

Blowers:
Canadian Fairbanks-Morse Co., Ltd
Northern Canada Supply Co.

Boilers:
Canadian Ingersoll-Rand Co., Ltd
Marsh Engineering Works
R. T. Gilman & Co.
The John Inglis Company
Wabi Iron Works.
The William Kennedy & Sons, Ltd.

Blue Vitriol (Conlagas Reg):
Canadian Fairbanks-Morse Co., Ltd

Borts and Carbons:
Diamond Drill Carbon Co.

Boxes, Cable Junction:
Standard Underground Cable Co. of Canada, Ltd.
Northern Electric Co., Ltd.

Brazilian Rough Diamonds:
Diamond Drill Carbon Co.

Brazilian Mica:
Diamond Drill Carbon Co.

Buggies, Mine Car (Steel)
Hendrick Manufacturing Co

Brazilian Ballas:
Diamond Drill Carbon Co.

Brazilian Rock Crystal:
Diamond Drill Carbon Co.

Brazilian Tourmalines:
Diamond Drill Carbon Co

Brazilian Aquamarines:
Diamond Drill Carbon Co.

Bridges—Man Trolley and Rope Operated—Material Handling:
Canadian Mead-Morrison Co., Limited

Bronze, Manganese, Perforated and Plain:
Hendrick Manufacturing Co

Buckets:
Canadian Ingersoll-Rand Co., Ltd
R. T. Gilman & Co.
Hendrick Manufacturing Co
Canadian Link-Belt Co., Ltd
Marsh Engineering Works
Mussens, Ltd.
MacKinnon Steel Co., Ltd
Northern Canada Supply Co
The Wabi Iron Works
The William Kennedy & Sons, Ltd

Buckets, Elevator:
Canadian Link-Belt Co., Ltd
Hendrick Mfg. Co
Peacock Brothers Limited
The William Kennedy & Sons, Ltd

Cable—Aerial and Underground:
Canada Wire & Cable Co
Northern Canada Supply Co
Standard Underground Cable Co. of Canada, Ltd
Peacock Brothers, Limited

Cableways:
Canadian Mead-Morrison Co., Limited
Fraser & Chalmers of Canada, Ltd
Mussens, Ltd
The Wabi Iron Works
R. T. Gilman & Co

Cages:
Canadian Ingersoll-Rand Co., Ltd Montreal
Northern Canada Supply Co
Fraser & Chalmers of Canada, Ltd
The Mine & Smelter Supply Co.
Mussens, Ltd.
The Wabi Iron Works
The William Kennedy & Sons Ltd

nection with harnessing Sturgeon Falls on the Mattagami River.

Will Reopen V. N. T. Mine.

Major J. Mackintosh Bell, in an interview with the Journal made the announcement that the work in connection with re-opening the Porcupine V. N. T. would commence within the next three weeks. It is planned to carry development work to a depth of 900 feet, with a view to conducting lateral operations at the present depth of 600 feet as well as at depth of 750 and 900 feet.

Dome.

Directors of the Dome Mines who visited the property over the past week-end were greatly impressed with the favorable developments of recent months, and particularly with achievements in the mill.

The Production Record.

Official figures showing that the gold mines of Northern Ontario produced approximately 30 tons of gold bullion during the past year, and that the Dome ranks second only to the Hollinger among the producers, are facts that have left a deep impression upon the official visitors.

Great as has been the achievement during the past year, it is reasonably certain that the results accomplished during the current year will mark another increase of about 25% over 1921. This will be brought about by an enlarged plant on the Hollinger, as well as a big addition to the McIntyre-Porcupine and a considerably increased tonnage on the Dome.

While these three big mines are setting the pace, the Wright-Hargreaves, Lake Shore, Teck-Hughes, and Kirkland are all grinding out their fair share of bullion, while the Tough-Oakes mill will go into operation within the next three weeks. There are good prospects that this year will witness the Porcupine Crown, Porcupine V. N. T. and Schumacher mills all in operation, as well as the Argonaut some time during the last quarter of the year.

These facts tend to show that the output of gold from the end of March forward will reach at least a ton and a half monthly, or upwards of twenty million dollars a year, with probabilities of this reaching a ton of bullion per week during the coming year.

Gold Reef.

Reports continue to circulate that there are good prospects of English capital becoming involved in the development of the Gold Reef mine, situated in the northern part of the Porcupine field.

McIntyre.

Within the next three months the addition to the mill on the McIntyre-Porcupine will be completed. This consists of a 250-ton unit which has been constructed for the purpose of treating carbonaceous ores encountered in one section of the mine. This will bring the total capacity of the plant up to 800 tons daily and should result in a production of approximately $3,000,000 per year.

Wright-Hargreaves.

The Wright-Hargreaves Mine has declared a dividend of 2½ p.c. payable April 1st to stockholders of record March 17th. This will call for the distribution of $68,750 and compares with $137,500 disbursed on January 2nd. The mill is now treating close to 200 tons of ore daily, and is producing approximately $70,000 monthly. The work of carrying the main shaft to deeper levels is progressing rapidly, and before the end of the current year the Wright-Hargreaves will probably be operating at a depth of 800 feet.

King-Kirkland.

The mining plant of the King-Kirkland is being assembled and will be completely installed within the next six weeks. The company is now preparing a report which will show results up to the end of 1921. The small amount of drifting at a depth of 100 feet showed an ore shoot 70 feet long and containing about $8 per ton across a stoping width. Once the new plant is installed, the underground work will be pushed forward vigorously.

Goodfish Gold.

At a depth of 80 feet on the Goodfish Gold Mines, the vein carries high-grade ore across a width of about six feet.

Hunton-Minaker.

The merger between the Hunton-Kirkland and Minaker-Kirkland is practically assured according to information circulating here. The terms of the merger have not been announced, but are understood to be mutually satisfactory. This information comes as an agreeable surprise following the rejection of the recent plan to merge the Hunton with the Gibson-Duncan..

Among other things, the understanding is that fifty thousand dollars will be provided to carry on deep work through the present Hunton shaft.

Ontario-Montreal-Kirkland.

At the special meeting of the Ontario-Kirkland held on March 9th, the plan to merge with the Montreal Kirkland was ratified.

The agreement provides for the formation of a new Company with a capital of $5,000,000, divided into 5,000,000 shares of the par value of $1.00 each. The Ontario-Kirkland, with a capitalization of $1,500,000, owning about 88½ acres, equipped with a complete plant, including a 100-ton mill, are to receive 1,500,000 shares of the stock of the new Company with the agreement that the new Company will assume to the exoneration of the Ontario-Kirkland Company its current liabilities amounting to not more than $120,000 as of the 15th of February, 1922, and in addition the new Company agrees to issue 481,250 shares of stock to provide for the payment of the present outstanding notes of the Ontario-Kirkland Company amounting to $173,250., and further agrees to issue additional shares at forty cents to cover the 6 per cent interest on the said notes.

After providing for the payment of all liabilities of the Ontario-Kirkland Company, and the issue of share for share of stock in the new Company, the present shareholders of the Ontario-Kirkland Company are to be given the privilege of subscribing to additional stock of the new Company before same is offered to the public.

The Montreal-Kirkland Mines, Limited, capital $2,500,000, owing about 200 acres, equipped with buildings, plant, and free of liabilities, are to receive 1,725,000 shares of the stock of the new Company.

Thus when the deal is finally consumated, the combined holdings will consist of about 280 acres, fully equipped with mining plants and mill capable of treating 140 tons of ore per day, which capacity can be readily increased when conditions warrant. Several veins have been opened on the Montreal-Kirkland showing high gold values, and the large acreage of the amalgamated Companies offers big possibilities.

Canadian Miners' Buying Directory.—(Continued)

Cables—Wire:
Standard Underground Cable Co of Canada, Ltd
Canada Wire & Cable Co.
R. T. Gilman & Co.

Cable Railway Systems:
Canada Wire & Cable Co.

Cam Shafts:
Hull Iron & Steel Foundries, Ltd.
Peacock Brothers Limited
The William Kennedy & Sons, Ltd.

Car Dumps:
Sullivan Machinery Co.
R. T Gilman & Co.

Carbide of Calcium:
Canada Carbide Company, Ltd.

Cars:
John J. Gartshore
MacKinnon Steel Co., Ltd.
Northern Canada Supply Co.
Marsh Engineering Works
Peacock Brothers, Limited
Mussens, Limited
Powley & Townsley, Limited.
R. T. Gilman & Co.
The William Kennedy & Sons, Ltd.

Car Wheels and Axles:
Canadian Car Foundry Co., Ltd
Burnett & Crampion
Hull Iron & Steel Foundries, Ltd
John J. Gartshore
Marsh Engineering Works, Ltd.
Peacock Brothers Limited
The William Kennedy & Sons, Ltd.

Carriers (Gravity):
Jones & Glassco

Castings—Brass
The Canada Metal Co., Ltd

Castings (Iron and Steel)
Hull Iron & Steel Foundries, Ltd
Peacock Brothers Limited.
The William Kennedy & Sons, Ltd.

Cement Machinery:
Hadfields, Limited
Hull Iron & Steel Foundries, Ltd.
Burnett & Cramptor.
The William Kennedy & Sons, Ltd.

Chains:
Jones & Glassco
Northern Canada Supply Co.
Canadian Fairbanks-Morse Co., Ltd
Canadian Link-Belt Co., Ltd.
Greening, B., Wire Co., Ltd.

Chain Drives:
Jones & Glassco (Regd.)

Chain Drives—Silent and Steel Roller:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal, Q
Jones & Glassco) Regd.).

Chemical Apparatus:
Powley & Townsley, Limited

Chemists:
Canadian Laboratories
Campbell & Deyell
Thos. Heyes & Sons
Milton Hersey Co
Ledoux & Co
Constant, C. L. Company

Chroms Ore:
The Electric Steel & Metals Co
Everett & Co.

Classifiers:
Mussens, Limited
Fraser & Chalmers of Canada, Ltd
The Wabi Ir . Works
R. T. Gilman & Co
The Dorr Company

Clutches:
Canadian Link-Belt Co., Ltd
Hans Renold of Canada, Limited, Montreal, Q

Coal:
Dominion Coal Co
Nova Scotia Steel & Coal Co

Coal Cutters:
Sullivan Machinery Co
Canadian Ingersoll Rand Co Ltd
Peacock Brothers, Limited

Coal Crushers:
Canadian Mead-Morrison Co., Limited
Canadian Link-Belt Co., Ltd
Peacock Brothers Limited

Coal Mining Explosives
Canadian Explosives, Ltd
Giant Powder Company of Canada, Ltd

Coal Mining Machinery:
Canadian Rock Drill Co
Denver Rock Drill Mfg. Co., Ltd
Canadian Ingersoll-Rand Co., Ltd
Sullivan Machinery Co.
Marsh Engineering Works
Hadfields, Ltd.
Hendrick Mfg. Co.
Powley & Townsley, Limited.
Mussens, Limited

Coal and Coke Handling Machinery
Canadian Link-Belt Co., Ltd.
Powley & Townsley, Limited.

Coal Pick Machines:
Sullivan Machinery Co.

Coal Screening Plants:
Canadian Link-Belt Co., Ltd.

Cobalt Oxide:
Conlagas Reduction Co.
Everitt & Co.

Compressors—Air:
Smart-Turner Machine Co.
Canadian Ingersoll-Rand Co., Ltd
Mussens, Limited
Peacock Brothers, Limited

Concrete Mixers:
Gould, Shapley & Muir Co., Ltd
MacGovern & Co., Inc
Mussens, Limited

Condensers:
Smart-Turner Machine Co.
Northern Canada Supply Co
Belliss & Morcom, Ltd.
Laurie & Lamb
Peacock Brothers, Limited

Concentrating Tables:
The Mine & Smelter Supply Co
Deister Concentrator Co

Converters:
Northern Canada Supply Co
MacGovern & Co., Inc.

Conveyors—McCaslin Gravity Bucket:
Canadian Mead-Morrison Co., Limited

Contractors' Supplies:
Canadian Fairbanks-Morse Co., Ltd

Consulters and Engineers:
Hersey Milton Co., Ltd

Conveyors:
Canadian Link-Belt Co., Ltd
Jones & Glassco (Regd.)
Powley & Townsley, Limited

Conveyor Belts:
Gutta Percha & Rubber, Ltd

Conveyor Flights:
Canadian Link-Belt Co., Ltd
Hendrick Mfg. Co., Ltd

Conveyor—Trough—Belt:
Canadian Link-Belt Co., Ltd
Hendrick Mfg. Co
Mussens, Limited
Jones & Glassco (Roller, Belt and Chain)
Hendrick Mfg. Co.

Conical Mills:
Hardinge Conical Mill Co

Copper:
The Canada Metal Co., Ltd.
Consolidated Mining & Smelting Co

Couplings:
Hans Renold of Canada, Limited, Montreal, Q

Cranes:
Canadian Mead-Morrison Co., Limited
Canadian Link-Belt Company
Peacock Brothers, Limited
R. T. Gilman & Co.
Smart-Turner Machine Co.

Crane Ropes:
Allan Whyte & Co.
Canada Wire & Cable Co
Greening, B., Wire Co., Ltd
Peacock Brothers, Limited

Crucibles:
The Mine & Smelter Supply Co

Crusher Balls:
Canada Foundries & Forgings, Ltd
Hull Iron & Steel Foundries, Limited, Hull, Que
Osborn, Sam'l (Canada) Limited
Peacock Brothers, Limited
Swedish Steel & Importing Co, Ltd
The William Kennedy & Sons, Ltd

Crushers:
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd
Hardinge Conical Mill Co
Lymans, Ltd
Mussens, Limited
Osborn, Sam'l (Canada) Limited
The Electric Steel & Metals Co, Ltd
R. T. Gilman & Co.

The Directors of the Ontario Kirkland have fought stubbornly against the extraordinary conditions of money, labor, and delays, the aftermath of the Great War, which are only too familiar to all of us, and have evidenced their confidence and good will toward the shareholders by personally advancing and procuring from time to time the funds necessary for additional costs, development and operation. Unpreventable delays in delivery of machinery, accidents and other causes held up production considerably beyond the time estimated by conservative engineers. This with the heavy current expenses piling up in the interim has left the Company in a condition where new capital is necessary and a welcome aid to continue in a safe, business-like, and profitable way.

In an interview with the Journal at the close of the meeting, Walter Hurd, promoter of the Ontario-Kirkland, stated that the cost of developing and equipping the property had been under-estimated, while unforeseen delays in securing equipment and commencing production had been the cause of the heavy debts.

Elston-Dunkin.

Surface work on the Elston-Dunkin property in the township of Ganthier has resulted in opening up some exceedingly rich gold ore. Further work is being carried on, and this enterprise promises to be one of the more interesting new developments of the current year.

Staking In Munro Township.

The staking of mining claims in the Munro township area on the strength of the discovery of placer gold has continued and a total of about 300 claims already been recorded. The staking rush is one of the largest since the discovery at Fort Matachewan.

Prospectors Active.

Larder Lake is said to be alive with prospectors, and there are general signs of increasing activity in the prospective fields all over Northern Ontario during the coming summer.

THE SILVER MINES.

Nipissing.

Another dividend of 3 p.c. is expected on the Nipissing, this being the regular quarterly disbursement which falls in April. Production continues to be heavy, while the treasury is in an exceptionally strong condition.

Keeley.

The recent paper by Mr. J. Mackintosh Bell before the Institution of Mining and Metallurgy in London gives a good general summary of conditions at the Keeley Silver Mines. These developments have been such as to offer promise that the South Lorrain district will replace to some extent the gradual decline in Silver production from Cobalt proper.

Colonial.

Reports are current that a diamond drilling campaign may be undertaken on the Colonial property for the purpose of determining the formation underground as well as established the location of the contact zone.

Victory.

The vein that was encountered in the shaft at about 300 feet on the Victory Silver Mines, dripped out at about 330 feet. It is planned to carry on cross-cutting operations at a depth of either 400 or 500 feet with a view to opening up this vein as well as others at a point in close proximity to the contact of the Keewatin with the underlying diabase.

Bailey.

Another vein has been opened up at the 4th level on the Bailey Silver Mines. Good mill rock has been encountered over the 18 feet of drifting so far done along the new vein.

Golden Rose.

W. R. Sweeney of New York has purchased the Golden Rose Mines, situated in the Temagami Forest Reserve, northwest of Temagami Lake. The price paid is stated to have been quite large and was paid in cash. This includes the purchase of a stamp-mill on the property as well as some other mining machinery. This property has been reported on several times recently, among those making reports being Mr. Hitchcock of the International Nickel Company. On being asked about the deal, Mr. Sweeney said: "Yes, I have bought the Golden Rose and have paid for it. Several offers have been made to me already for its purchase, I have not decided what I shall do with it yet."

The Golden Rose is one of the oldest known gold prospects in this part of Northern Ontario and has been idle for a good many years.

According to the official returns as compiled from the records of the Bureau of Foreign and Domestic Commerce of the United States, America imported during 1921 no less than 125,306,841 barrels of crude oil, as compared with a total of 106,175,289 barrels for the previous twelve months. With the exception of 122,000 barrels, the whole of the imports came from Mexico. During the year the total exports amounted to 8,939,634 barrels, as against 8,757,092 barrels for the preceding year. Of the total, 7,166,874 barrels were last year shipped to Canada. The excess of imports over exports last year was 116,367,207 barrels.

MINERS'
Gold Washing Pans

OVERSTOCK SALE

Heavy Copper or Aluminum, 16 inches diam., 2½ inches deep.

Aluminum, each - $2.00
Copper " - 2.50

Terms—Cash with Order.

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Chemical and Assay Apparatus
MONTREAL

EDITORIAL

RATIONAL MINING INVESTMENT.

GOLD mining has of late become so well-established in Ontario, and some of the mines have had such spectacular success, that world wide attention is being drawn to the new and promising field. We have recently reached the depths of a depression, and are now, by common consent, on the up-grade. With the revival of legitimate business will come also a revival of certain practices, often called business, that are more properly called by less dignified and more unsavory names. Gold mining is sure to suffer its full share of attention from the "get-rich-quick" and their kind; it is incumbent upon those vitally concerned in the welfare of our mining industry to see that the useless and senseless activities of these gentry are kept at a minimum. "Fore-warned is fore-armed." The public must be told of what is coming, that all susceptible to protection may have whatever help can be accorded by legitimate mining men. This is merely what is due the public from the professional miner.

From the press and from personal information, we gather that a campaign of irresponsible and illicit stock flotation is to be begun in London, using the good name of Northern Ontario's gold mines as the bait. It has already begun in Montreal. This sort of gamble appeals irresistibly to certain people, who are bound to be parted from their money, whatever precautions are exerted to guard them. But it is on behalf of another class of investor that we wish to make a suggestion.

Those that have accumulated capital to the extent of becoming investors in measurable degree, have usually a moderate amount of caution and discretion, as a prerequisite. We may assume that most investors will inquire to the full of their ability as to representations made them by promoters or vendors of stock, and will require some evidence of their "bona fides". That many investors fail to learn the truth about the mines (or near mines) represented by their stock, and that often the good faith of the promoter is demonstrated chiefly by the large proportion of good money he keeps in his own pocket, is a matter of record. The obvious means of avoiding this preventable waste of capital that would otherwise be available for legitimate mining development, is to put within the reach of people who wish it, the truth. The present means for circulating the truth are not so hard worked as the means for circulating falsehood. Yet the truth should be widely known, and can be if certain simple devices are put in operation.

The Canadian Institute of Mining and Metallurgy is profoundly interested in the progress of mining in Canada, and in the adequate provision of funds for its rapid development. While the membership of the Institute is comprehensive, it has in its Professional Members an exclusive class of well-qualified mining engineers. The requirements for admission as a Professional Member are strict, and the credentials submitted by an applicant are now subjected to so close a scrutiny that admission to professional membership in the Institute's guarantee of good character and professional experience and ability. Upon these men, singly and collectively, rests chiefly the responsibility of protecting the good name of the industry upon which they depend for a livelihood.

Our suggestion is that the officials of our Institute should make it known, publicly and broadcast, that its services are at the disposal of intending investors, who may wish authoritative information about specific Canadian mining properties, or the financial structures built upon such properties. The chief means to this end will be a printed list of the Professional Members of the Institute, setting forth in brief their qualifications, experience, and special knowledge. If the public is informed officially where to look for sound professional advice, many investors will avail themselves of the assistance they need. The Canadian Institute of Mining and Metallurgy can now, if it will, exert upon behalf of the profession and the public the good offices performed by the bar and medical associations.

BROADENING OUT, AND SPECIALIZING

FORMAL education of engineers is so recent a venture, compared with that of other professions, that its requirements still need definite formulation, and expedients to meet these requirements are still subject to pronounced, if not radical change. Members of the old established professions are hardly yet ready to receive the engineer in the fold of the learned. His credentials are still imperfect. His manners are out of accord with his pretentions. His function is not yet understood, the ideals of his profession have still to be clearly defined and generally accepted. He has not yet developed the exclusiveness and sense of superiority that is the sure mark of the self respecting member of the bar, the army, the medical profession or the clergy.

The newness and often vagueness, of present-day engineering education is particularly marked in the mining branch. Mining was recognized as a distinct species of

engineering at a time when all other engineering was left to the Army and Navy, and to church-building enthusiasts of the clergy and laity. Yet the education of mining engineers today is so various throughout even the English-speaking world, that an outsider might be excused the wonder aroused by the diversified result. Graduates from certain British institutions have little but a thorough grounding in the fundamental sciences, and a history of their profession. On the other hand, certain colleges in the United States emphasize present-day practice to the virtual exclusion of more fundamental considerations. There has not yet been clearly formulated and generally adopted a scheme of education for mining engineers that will provide both a firm grasp of principles and a wide adaptability to existing conditions. We may well study the lawyer's term of pupilage with this point in view.

The Canadian colleges where mining is taught seem to have found the middle way. A solid grounding in the fundamental sciences has been followed by a finishing-up year or so in present-day practice. There is no doubt that much room for improvement exists; but the record of our graduates, at home and abroad, is evidence that their education has not been completely off the mark. Toronto University is offering more and more facilities to graduate engineers for research, and so is paving the way for highly-specialized technologists. Queen's University offers to graduate engineers a special course in economics, with a view to training them in the responsibilities of executive office. On the other hand, all our colleges tend to lay more emphasis upon a good English course and a comprehension of the elements of economic science, both of them essential to a good education, and too often neglected in a technical curriculum.

Special conditions require special education. This axiom has become an obsession with some educationists, notably extreme proponents of technical education. Others, such as those over-enthusiastic for the classical education, deny the validity of the axiom. Without under-rating in any way the value of, and the necessity for, a firm grounding in the fundamentals of mining engineering, we wish to point out here a need, peculiar to a new country like Canada, that has not been adequately met in our case.

Canada is just entering upon a career of mining activity that promises to be long and useful. The promise of her youth is hard to visualise, it is so comprehensive and extends so far into the future. If she is to fulfil this promise, it will be mainly through the agency of the graduates of our mining schools. What a charge, then, rests upon the shoulders of those responsible for the guidance of the next generation of mining engineers! These mentors must forecast with certainty the conditions their pupils will be called upon to meet, and prepare them well to fulfil their tasks.

In mining, more than in any other industry, Canada is still in the pioneer stage. Moreover, the nature of mining is such that pioneer effort will always be essential to its progress, to provide the succession of new deposits necessary to replace vanishing reserves. So the Canadian mining industry requires at present, and will require for a generation or more, an abnormal proportion of pioneers among its technical men.

Are our colleges filling this need? We fear not. For some reason, our graduate mining engineers appear to fight shy of pioneering effort, choosing rather the comfortable existence of a follower-up in the advance of progress. We need leaders, men for the van-guard of progress—the position of honour in an advance. The natural instinct of our young men is toward pioneering and adventure, as evidence the annals of the Great War. It must be that the ideas inculcated during their college days deter them from following this instinct, rather than encouraging them to pursue it.

This point is of prime importance to our growing mining industry. It is not clearly before the minds of our educationists and administrators. We invite discussion in the Journal's columns.

POTASH FROM FELDSPAR.

THE Imperial Institute, London, has just published a monograph on potash. This was prepared under the direction of the Mineral Resources committee and gives a very good account of the sources of potash.

Soluble potash minerals, mined on a large scale in Germany and France, supply most of the world's needs. Numerous other sources have, however, been drawn upon on occasion, and of these the feldspars have attracted most attention in Canada. It is of interest to note that while the problem of extracting potash from feldspar economically has not yet been solved, this possible source of supply is still attracting attention. Our abundant supply of feldspar and our present lack of soluble potash minerals; our need of potash for agriculture and our dependence on Europe for the supply are factors that stimulate investigation. It is nevertheless a problem that has so far defied solution. No potash in commercial quantities has yet been derived from feldspar, even the stimulus of war-time shortage having failed to give the expected results.

EDITORIAL NOTES.

HON. JAMES MURDOCK, Minister of Labour for Ontario, appears once more as a fearless exponent of the truth. This time he protests the action of J. B. McLachlan, secretary-treasurer of the United Mine Workers of America, at Sydney, Nova Scotia. Failing to attain his ends by fair means, McLachlan has resorted to foul. His influence, and that of others of radical tendency in Cape Breton, was exerted successfully to persuade the miners to reject last week the compromise effected by their own executive (McLachlan excluded, with the officers of the Dominion Coal Company. The

result is that, instead of receiving the enhanced wages agreed to in this compromise, the men still receive the lower wages set by the official Gillen Conciliation Board.

McLachlan has now counselled an un-British, undemocratic and un-sportsmanlike method of attempting to force his views on the Dominion Coal Company and upon the public. We are sure his "sabotage" and "striking on the job" will prove unsuccessful. It is unworthy of Canadians (McLachlan is not indigenous to Canada), and deserves the censure now accorded similar "Red" methods in Russia by the larger part of the thinking public, and by that sane and fearless labour leader, now a Minister of the Crown.

The old Laurentian Mine, in Northwest Ontario, prominent in the gold boom of twenty years ago, is being opened up. It is one among many such properties, most of them the victims of stock manipulation and mismanagement during the years just preceding and succeeding the turn of the century, that are now well worth careful re-examination. In many cases, it is known that only a perfunctory examination of the ore-bodies has ever been made, in spite of imposing mills and surface equipment.

The Journal is not at present satisfied that the new attempt to open up the Laurentian Mine has been organized in such a way as a present-day mining engineer can thoroughly approve. The raising of money promiscuously at this time is liable to cost more than it is worth, and consequently is likely to impose an undue burden of debt upon the natural resource whose development is attempted. We hope that the promoters of the new Laurentian venture have given more regard to this fundamental consideration than rumour has given them credit for. Only on a sound basis can such a mining development be successful.

Sales of copper from New York, the world's chief centre of distribution, are going up by leaps and bounds. Britain is the chief buyer. This speaks well, not only for the revival of industry in Britain, but for a revival of activity in copper mining. Copper sales on a large scale will lead rapidly to higher prices. The large copper deposits of Northern Manitoba will benefit ultimately, if not soon, from this movement.

A despatch from Calgary quotes Mr. S. E. Slipper of the Geological Survey in optimistic vein. Mr. Slipper has had a thorough experience in oil geology, and has a reputation for acumen and discretion. He is quoted as saying that a new oil well at Kevin, Montana, sixteen miles south of the international boundary, indicates possibilities on the Alberta side that surpass any known area in Western Canada. Unless Mr. Slipper has been misquoted, we have here a professional opinion to which serious attention can be accorded.

The value to a steel producer of a diversified production is well illustrated by the fortunes of the Steel Company of Canada during this trying time. Though rails and large sections are in small demand, the housewife cannot get along without tacks, nor the farmer without fence-wire; and there are several million such consumers of steel products throughout the Dominion. Probably the iron and steel works in Cape Breton (the nearest thing we have to an indigenous Canadian iron industry), which is now on the verge of closing down for lack of orders, will have provided for fabricating more of their raw product before the next stretch of hard times comes upon us.

W. Jett Lauck, one of the leaders of the United Mine Workers of America, is quoted as saying, "The United Mine Workers defy the country that wants deflation of wages!" Mr. Lauck seems to have the heart of a lion, and the confidence of a born leader. We wonder which battalion he headed in the great fight at Chateau Thierry.

The Port Arthur, Board of Trade have recently memorialised the Department of Mines, Ottawa, requesting that the unfinished magnetometric surveys of the iron ranges in that district be completed. This is both fitting and timely. For the sake of the slight amount of expense involved, we might well afford to learn more about these bodies of ore, of such immense potential value, and of special interest at present in view of the experiment at Babbitt, Minnesota.

Time was when a library was not a necessity—or seemingly not—to the mining man. That time has long passed away. A compact library of handbooks can be carried now without inconvenience. It is a painful mistake to be without these aids to proper work.

TO THE TUMP LINE.

O! Tump Line! Emblem of base servitude!
Symbol of suffering in the Northern wilds!
How oft hast thou upon my tortured frame
Inflicted pains and penance more than death.
How oft have I, weak victim, in thy toils
Felt all the anguish of the criminal hanged
Hanging were better—for a moment's pang
Ends all. Thy service is an endless chain
Of horrid hangings, pangs and frightful toil
How oft, I say, in stepping high and wide
To clear a cursed windfall in the trail,
Hast thou betrayed me, Tump Line, badly tied
And left me helpless as a split canoe?
Too often! Now do I forswear, abjure
The northern Wilds and all that they imply.
* * *
I've cursed thee, Tump Line and (what pleasure to myself)
I've cursed thee in the blankest of blank verse.

VNON

A Five-Foot Shelf of Books for Mining Men.

(Written specially for the *Canadian Mining Journal.*)

THE fact that the mining engineer is called upon to travel a great deal and is often marooned for months at a time, far from libraries and bookshops, should not prevent him from keeping his mind in training. It does not debar him from using his tooth brush and razor. His mental requirements mean quite as much to him as the use of his toilet accessories.

No two persons can be counted upon to concur wholly in the choice of a "travelling" library. But the majority of those who have really used books will agree on at least five or ten. For this reason, I shall begin the list of what I consider an easily portable library with the titles of a few volumes that can be had in uniformly small size, and that appeal to all whose training has been based upon a knowledge—wide or limited—of geology. I purposely omit mention of certain invaluable modern engineering hand books, first, because they may be too bulky to carry; or, second, because the mining engineer would not be found dead without them.

The Geological Foot.

Turning to geology, then, I believe that for mental profit, the older authors are the best to read. My choice would be Sir Archibald Geikie—in one volume. In Geikie one gets pure diction, concise statement, logical arrangement—a very pithy and readable whole. Of course, the reader will see that I am not recommending Geikie as a book of reference, but as a stimulating volume that will furnish many an hour of pleasant thought, and will promote one's intellectual digestive processes.

In reading (not *studying*), and re-reading Geikie I suggest the use (at first very casually) of a note book, so that, at a later date in civilization, certain allusions may be looked up, and certain of Geikie's highly condensed paragraphs expanded into modern re-statements.

Naturally, there are a dozen—well, no, not a dozen, but perhaps four—other authors who might take Geikie's place. However, having chosen him, I would certainly choose Hugh Miller as his companion. "The Old Red Sandstone" will never lose its charm. Not alone is the reader refreshed, but he is also given the privilege of reading the simplest and best of English. So much, then, for geology.

As to Chemistry.

To the reading man who reads for both pleasure and profit, I would, five years ago, have commended Mendelejeff's "Principles of Chemistry,"—wonderfully original and complete volumes. Today, however, I would advise him to choose Molinari's "Inorganic Industrial Chemistry," a book that contains a wealth of reading, is modern, and most ably prepared. In Molinari one gets suggestive side-lights on mining and metallurgy and on the world's trade in products of mine and quarry. Both authors review the principles of chemistry in a way that only masters can attempt.

What of Mineralogy?

I know that Dana's "Text-book of Mineralogy" has no rival (although it has many supplements and complements) and that, for me, it never will have. But new phases of the study of mineralogy are being developed. Mineralography, the practical field determination of mineral entities by means of microchemical tests and the microscope, is one of these new phases. This may be taken as a suggestion worthy the attention of the searcher after more definitive methods than the unreliable (though honoured) blowpipe.

Prospecting.

From the time of Georgius Agricola downward, there have been published swarms of books and booklets on prospecting. Only the most recent have practical value. Many of these are convenient and suggestive pocket-books. One bulky and popular "Handbook" has a really invaluable section on prospecting. However, it is truer of prospecting than of any other part of mining, that the only way to learn is to prospect. I do not, therefore, make any specific recommendations in this department. What time is not devoted to our supposititious book-shelf can well be spent in compiling one's own notes. A mild hint I may throw out. Either Darwin's "Voyage of the Beagle" or an English mining engineer's record, "A Naturalist in Nicaragua", is an almost ideal model of records of daily observations.

Mining and What-not.

The literature of mining is too vast, and increases too rapidly to choose any of the hundred of good books available, as being more meritorious than others. Let me direct the reader to the catalogues of well-known publishing houses on both sides of the Atlantic.

* * *

There is yet much empty space on our five-foot shelf. Since it were invidious to pick and choose amongst the multitude of modern writers, let me draw attention to two volumes that will be a never-failing source of instruction, sheer joy, amusement, and edification.

One is a translation from Oriental writers and compilers, done into wonderful English at the express command of James the First of England. The other is a group of jewel-clusters, the handiwork of a simple English playwright who charmed the ear of the Virgin Queen of England in her declining years. Both works can be had cheaply and in convenient size. Neither is quite as popular as it deserves.

* * *

After all this talk about it and about, our shelf is not yet half filled.

Do not attribute it to indolence or indifference if I refuse to name another book until I am assured that you have read those mentioned above. And so, adieu.

CAPRICORN.

PERSONAL.

Major Gwyn Williams of London has returned to Toronto after visiting mining districts in Northern Ontario. He leaves this week for England.

Premier Norris of Manitoba is urging on Hon. Mr. King the return of the Province's natural resources and asking compensation for that part already alienated.

Mr. W. R. Wilson of Fernie, B.C., has been elected president of the Canadian Institute of Mining and Metallurgy.

The Modern Column Hoist

Its Construction and Use in Mine and Quarry Operation.

By F. A. McLEAN, Assoc. M. C. I. M. & M.

(Continued from page 152)

Some Applications of Column Hoists in Quarries.

At the Wetmore and Morse Granite Quarries in Vermont, two hoists of the Little Tugger type are used. One handles drill steel, powder, tools, etc., and the other is used for hauling the heavy cable from one of the derricks, across the quarry pit. (See Fig. 10.)

On one occasion, the swinging gear on one of the big derricks broke, and these little hoists were bolted to 2 inch planks and chained to a large rock, as shown in Fig. 9. Lines from the hoists were led to opposite sides of the bull wheel, one swinging the boom and the other bringing it back. This rig worked quite satisfactorily while the swinging engine was under repair and illustrates the value of these machines for emergency work.

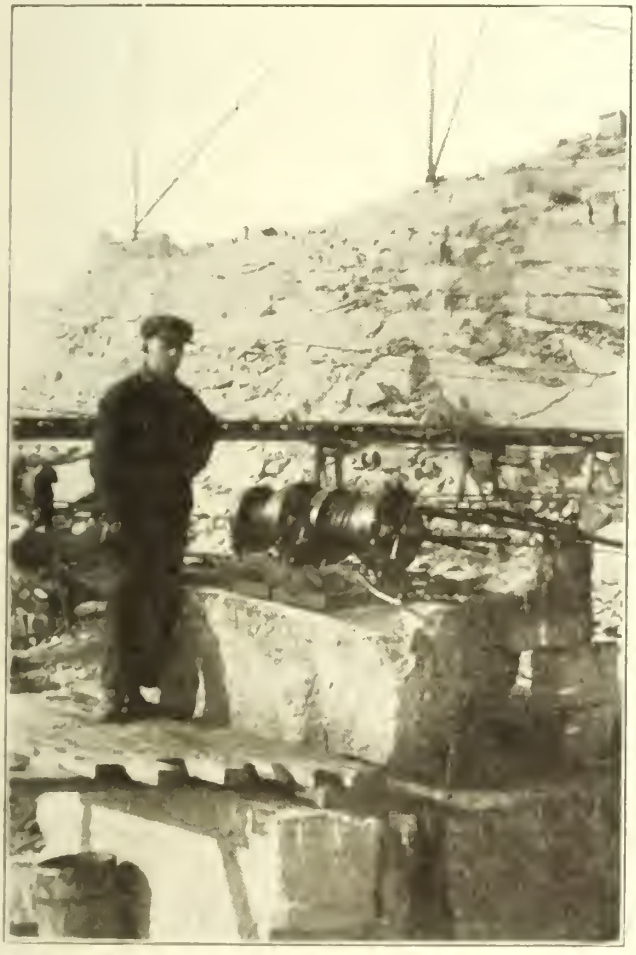

Fig. 9. — Two Hoists of the Little Tugger Type used for swinging a large derrick.

At the Rockland Lake Quarries, loaded cars are delivered by the locomotives to an inclined cableway, where they are hauled up into the crusher house and dumped directly into the crusher. From here they coast down an incline and up a slight grade toward the upper end of the quarry, where they are switched over and run by gravity, back parallel with the quarry face. It frequently happened that a car, or two cars would not carry past the switch, and to keep the cars in motion, a 1 H Little Tugger Hoist was bolted to a timber at the extreme end of the track and hauls two 6½ ton cars up this 6 per cent. grade without any trouble.

Tugger Slushing in Metal and Coal Mines.

Time studies show that one of the most promising fields for labor saving in the mine is in "mucking" which in metal mines is estimated to consume 35 to 45 per cent. of the total working time. For handling dirt on the surface in making excavations for buildings, roads, etc., the drag scraper or slusher is a very old arrangement, and various modifications of it have been

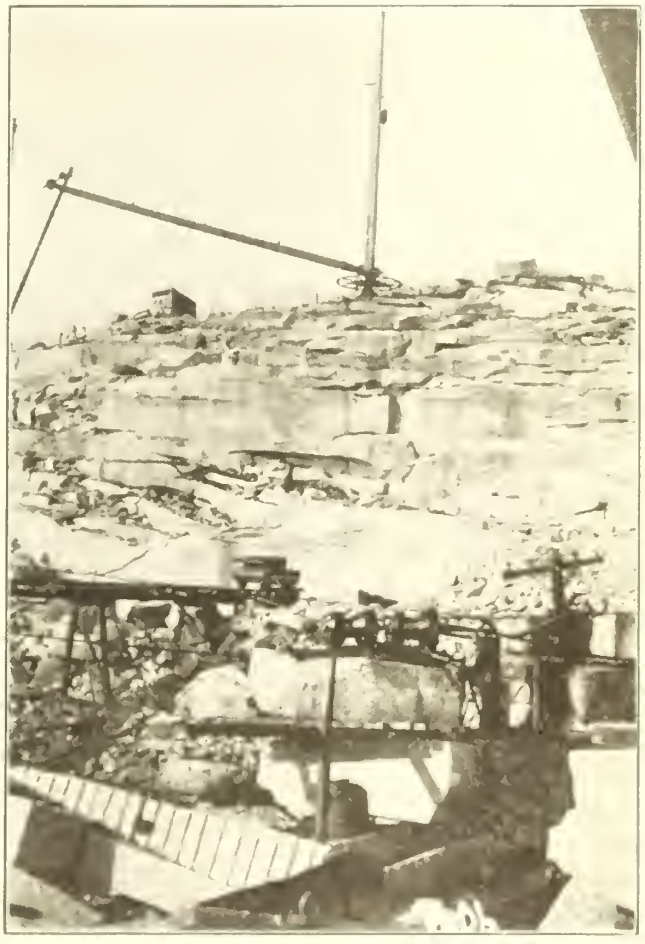

Fig. 10. — Tugger Hoists used for hoisting supplies and carrying derrick cable across quarry.

used underground for several years. The first requisite of a simple, underground scraper system in metal mines, is a small, portable, powerful, reversible and reasonably inexpensive hoist that can be set up anywhere, on a post, drill column, or sled and operated by anyone under all sorts of conditions.

Hoists of the Little Tugger type appear to have met these conditions satisfactorily and have led to the introduction of what may be termed "Tugger Slushing Systems", into coal and metal mines in various parts of the country.

Type of Scraper.

Some mines use a scraper similar to the ordinary road scraper—which is quite all right if the ground is broken finely or is of a sandy nature. Where the ground is chunky, a scraper made more nearly vertical

and with fingers of 20 pound rail on the bottom so that it will more easily dig into the broken rock, is better. In one mine in which the ore was very wet, a scraper formed of slats or bars to form a sort of rake, was used. It is a simple matter to make the scraper of such size and construction as will best suit the character of the material to be handled. As a rule two men—one on the hoist and the other on the scraper—are employed and change jobs at intervals.

The most common arrangement where there is no tail rope for hauling back the empty scraper, is to use a single hoist bolted to skids, as shown in Figures 11 and 12. In Figure 13 it will be noted that the hoist is mounted on a horizontal column bar, to permit the ore car being loaded to go underneath it. It is only the work of a few moments to alter the height of the hoist or move it from one location to another with this arrangement. In some mines, two hoists mounted on a single column are used so that the scraper can be hauled back by a tail rope; (Figs. 14 and 15) although it is questionable whether the use of a tail rope is of much

Fig. 11. — Mucking ore in a drift with a Little Tugger Hoist.

advantage where the haul is less than 50 feet, as the clutch on the hoist makes pulling the scraper back by hand a comparatively easy job on short hauls. When a straight pull from the breast to the raise in which the ore is dumped, or to the car to be loaded cannot be secured, a snatch block is used to make the turn, but should be avoided whenever possible.

Another slushing method used in a large Michigan Iron Mine, consists of a light channel iron supported by legs or drill columns and located near the top of the drift. This channel carries a sheave on its front end, an 1-H Little Tugger Hoist on its rear end, and a trolley between. Winding up the rope on the hoist drags the scraper into and up the pile of dirt, and when filled, it is run backward to a point over the tram car and dumped. It is then drawn back by hand to the digging position. In using this arrangement in hard ground, however, it was found that in case the nose of the scraper got under an immovable chunk the man on the handles was likely to go over the top and head into the breast. This particular method is therefore, only applicable to use with dirt that will break easily and without large chunks.

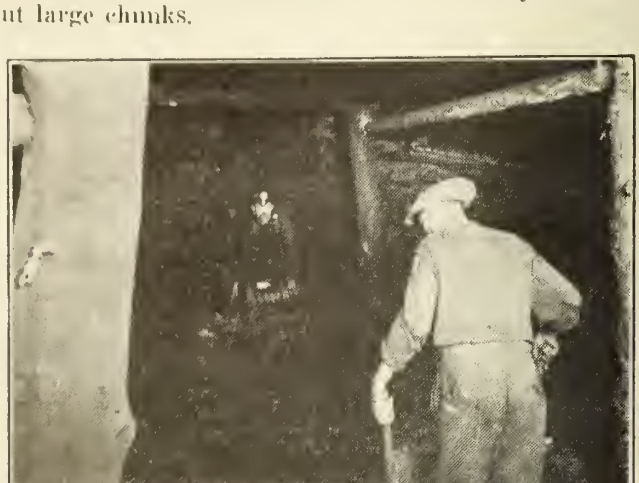

Fig. 12. — Mucking ore in a chute.

Tugger Slushing at the Spruce Mine.

The Spruce Mine at Eveleth, Minn., is a typical "soft ore" mine worked by the top slicing method and in places where the ground is strong enough to permit of putting in raises at fifty feet intervals or less, mucking is done by Tugger slushing—a 1-H Tugger is set convenient to a raise and a slusher attached to the rope. This slusher is a small edition of the ordinary contractor's drag scraper, 24" x 30" x 9" deep at the back and has a capacity of about 3 cu. ft. One man operates the Tugger, the other carries the scraper to the pile of broken ore, fills it and returns with it, easing the scraper around the timbers, corners, etc., and dumps the ore at the raise or car. At present cars are loaded by this means only on the level; in those sections where the mining has progressed down to the point where haulage level has become the sub or slice level; and where the timbers allow sufficient head room to dump the scraper.

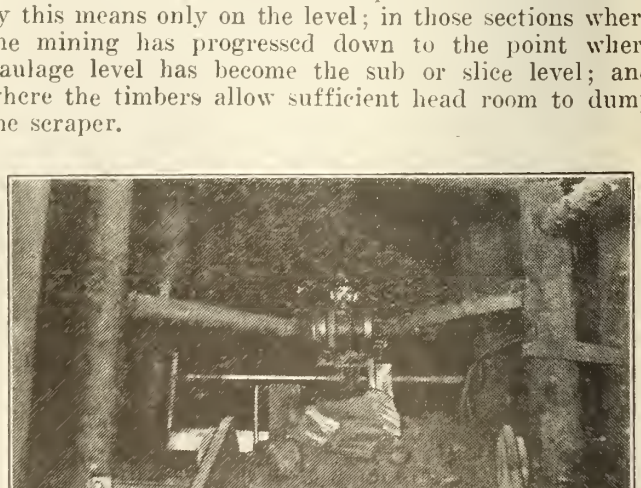

Fig. 13. — Mucking ore into a tram car with a Little Tugger Hoist.

Where they are mucking in the slices, about half of the work is straight hauling. The right angles are eased by blasting off the corners of the pillars but the man who operates the scraper has considerable work to do in keeping it from catching, and in places where it is necessary to turn a right angle a snatch block is placed at the corner and the scraper either hauled to the corner and dumped and the ore relayed in two operations or the rope removed from the snatch block and the haul continued. This depends on the men, and on the amount of ore to be handled. Beyond this no provision is made to protect the rope in the curving hauls, it being permitted to ride against the timbers, etc.

The cars are loaded by hauling the scraper up an inclined slide made of plank about ten feet long, one end of which is elevated slightly higher than the side of the car, the height of the timbers on the hauling

Fig. 14. — Two Tuggers mounted on one column for tail-rope slushing.

level permitting the dumping of the scraper. All car loading is straight hauling, the cars being brought to the opening from the crosscut and the Tugger set on a cross bar on the side opposite the chute. The Tugger is usually set directly behind the raise to which the ore is handled and generally remains in the same place for a week or more. In the haulage level where cars are filled, the machine must be moved as fast as the pillar is cut back and generally is shifted every three or four days. Where the mining is carried on under the rock capping it is not necessary to use so much timber and the machine may not be shifted for two weeks.

Mucking by hand ordinarily takes about 10 per cent of the total working time. The slusher is in use about 25 per cent of the total working time and is operating continuously for from 1½ to 5 hours depending entirely on the amount of ore broken. At times under the rock where there is little timbering to do, enough ore is blasted to keep the slusher at work the full shift. Depending on material (fine or chunky) and distance the men will handle from 8 to 12 tons an hour with the slusher, each trip of which brings about 500 lbs. of ore to the chute.

The Tuggers are mounted on a home made turn table arrangement which is fastened to a skidder truck and blocked down from the roof of the opening. In places where they are loading cars an auxiliary cone is bolted to the Tugger base and the Tugger placed on a stretcher bar on which is placed a regular column arm clamp, the whole arrangement being elevated high enough so that the rope clears the top of the car.

Air conditions are not very good in this mine due to use of under-size pipelines. Pressure at compressor is around 70 lbs. but not more than 58 to 62 lbs. at the hoist and running pressure ordinarily is 45 to 50 lbs. and sometimes as low as 36 lbs.

Hoist operating troubles are practically nil, it being estimated that the Tuggers used in this work average a year's service before going to the shop. If the machine is lubricated properly there is no trouble. In fact instances have occurred where the hoists have been buried under tons of rock and when dug out, started again without any repairs.

Cost of operation is rather hard to estimate, no figures being available, but electricity costs about 3.5 cts per K.W.H. and considering that the machine is operating but half the time slushing and as the slusher is only hauled loaded by the hoist, it would appear that the cost for air is in the neighborhood of 25 cts an hour. Contracts are set from 5 to 10 per cent. lower in Tugger than in shovel places.

When this work was first started it was rather hard to convert the men to the use of the slusher, but now they will ask for one whenever conditions warrant them.

Fig. 15. — Tugger slushing with tail-rope showing scraper and arrangement of snatch block.

The following figures show relative production in car and Tugger places:

Comparative Car and Shovel Operation—Spruce Mines Sept. and Oct. 1920.

	No. Contracts	Tons Mined	Shifts Worked.	Tons per man per day.
Tugger Slusher	11	17,092	1371	12.13
Shovelling by hand . .	21	783	2257	10.09
Increase Tugger over hand				2.31 or 13.10 p.c.

Comparative Shovel and Incline Plane—Spruce Mine—August, 1920.

	No. Contracts	Tons Mined	Tons per Man per day
Tugger on Inclined Plane.	3	3555	12.65
Shovelling by hand . . .	3	2610	11.60
Increase Tugger over hand			1.05 or 9.05 p.c.

In analyzing the above figures, it will be seen that they cover production of enough ore to make them worth something. The first statement covers handling ore to raises and adding to the increase in production the saving in track laying, and spreading the fixed overhead, the final cost figures would undoubtedly be more than 23 p.c. in favor of the Tugger method. The second comparison in the operation of loading cars does not show up so well for the reason that the air pressure was insufficient to haul the slusher up the incline with any speed and also that the first two sets of ground off the crossent had to be hand shoveled and the slusher really handled only about 60 per cent. of the production. However, taking the saving in track and timbering into consideration, there is certainly much more than 9 per cent difference in favor of the Tugger system.

Tugger Slushing in Buggy Mining.

At the Hollenbeck Colliery of the D. L. & W. at Wilkesbarre, Pa., they use buggies in a vein of coal about 4 to 5 ft. thick on a slope of some 18 per cent. and use 2 "Little Tuggers" to lower the buggy to the dump and return it to the breast, one hoist being mounted in "a break through" and serving two chambers. The buggy in dumping runs into an automatic dump provided with a trip which opens the front of the buggy, the coal then drops on to the floor of the entry and is loaded by hand into the mine cars.

The principal advantage of the Column Hoist and Scraper rig in places where buggies are now in use, is the elimination of the track and buggies in the chambers and the fact that the scraper can handle more than can be handled with shovel and car. The portability and low comparative cost of this method makes it possible to arrange the work so as to allow one machine to one or two chambers, sometimes giving three men two places to work and making the work more efficient by cutting out a lot of work changing rigging, etc., from one chamber to another.

Advantages of Tugger Slushing in General.

Obviously, the Tugger method can be used in places where it would be impossible to use a large loading machine and is more flexible. It simplifies the replacing of loaded cars with empties and in the sub-levels it dispenses with track laying entirely, if the raises are properly placed with reference to the slices. It can be worked in seams of any height, although more favorable to low-seam operations than high and is not affected by seams of moderate inclination.

The entire system is simple and economical to operate, easily shifted from place to place, and—in the event of falls of roof, little or no injury to the hoist can occur—as it is free from small exposed parts which might be bent or broken off.

AN OLD FRIEND REVIVING.

Once more the Lake of the Woods seems destined to hear stamps dropping, and, in addition, the roar of the ball mill. The old Laurentian, at Gold Rock, after being closed for almost a generation, is being unwatered. It has now become the property of the Kenbrooke Gold Reserve, Limited, whose head office is at Sherbrooke, Que. The mill buildings are said to be yet available, and the machinery in better case than had been anticipated.

It is understood that the company proposes to sink the main shaft another 500 feet; ball mills and cyanide vats are to be installed, and the whole mill modernised. A superintendent and crew of men are now working. The property consists of 216 acres, and the average value of ore blocked out in the mine is estimated at over $16 a ton. There is said to be a large tonnage.

When the Laurentian was running it was thought to have a future, and with modern milling methods and a more complete recovery than was possible by mere amalgamation the outlook should be better today.

Even more important, perhaps, than the re-opening of the Laurentian is the resumption of work on the Mikado, a mine that all Kenora believes to be without a peer in this region. There is thought to be a very large amount, perhaps $4 a ton, in the tailings heap, which would indicate that the recovery by amalgamation was not good. At any rate, the present summer will tell the tale, because so soon as the ice goes the workings will be de-watered and exploratory developmen begun. Provided ample capital is forthcoming and the best technical talent retained, the Mikado may quite possibly prove itself to be what so many claim it to be—an exceptionally good gold mine.—Chas. A. Bramble.

INTERNATIONAL COAL AND COKE.

The annual report for 1921 of the International Coal and Coke Co., Limited, of Coleman, Alberta, just received, records a satisfactory year, in spite of hard times. A dividend of 4 per cent has been paid on the capital stock of $3,000,000, and the reserves are unimpaired. The report concludes thus:

"The policies adopted by your Company, after careful consideration, with a view to protecting it against the evil effects of such a period as at present, have proved effective, enabling us to look forward to the future with confidence.

"The physical condition of the mine is good, and the financial position of the Company sound."

Mr. O. E. S. Whiteside, the man in direct charge of the Company's mines, is to be congratulated on having successfully met a trying time.

News and Comments

By ALEXANDER GRAY.

PAKOWKI RESERVATION OIL CONCESSION.

P. Chester Thompson, erstwhile of Butte, Columbia, Venezuela, Wyoming, and meanwhile of Porcupine, is a lively bird of passage; so it is not surprising to hear that the Ottawa Government by Order-In-Council granted to him and his associates the rights over about 28,000 acres in the Pakowki Bird Reservation. It is unusual to have it so, and it is a reversal of Government policy to have it thus; but Mr. Thompson has the documents signed, sealed and delivered, and preparations are being made for an immediate test of the Sweet Grass Arch, as it is termed, in Southern Alberta. Nominally the acreage is held by the Sanctuary Oil Company, Mr. Thompson taking his cue from Pakowki Lake, the Bird Sanctuary. Actually, title is vested in the Royal Canadian Oil Syndicate, which will conduct operations. If the gas done in evidence, and other structural features confirm the optimism of the organizations interested then the Prairie Provinces will have made a real start in bulk production. This Pakowki Bird Reserve has possibilities. What drilling was done to the northwest of it—the Foremost Well for example—was disappointing. Because the area dealt with by the Hon. Mr. Stewart and the Government was a preserve, or had been, previous governments were loath to grant concessions. Mr. Stewart, unlike his predecessor, took the position that the ground is worth proving, and his stipulation is that drilling must proceed promptly, a bond of $15,000 being exacted for performance under the agreement. The 44½ sections are sufficient for extensive exploration, provided a measure of success is met with in the initial drilling. Each section has to be tested. If the first section yields oil, the Royal Sanctuary people take it at 50c an acre and the usual royalty of 2½ per cent. for the first five years, 5 and 10 per cent. thereafter. When the first well is finished, two others have to be drilled, and then, if the venture succeeds, the Government and Thompson interests share fifty fifty. P. Chester Thompson and Jack Reynolds have placed the bet. Now let them roll.

MANDY MINE RETURNS INVESTMENT.

It is to be noted that the Tonopah Mining Company did not fare so ill from its Mandy Mine venture. The mine, it is announced, has been "stripped of it's profitable commercial ore." What remains that might be disposed of were transportation facilities otherwise, is not stated. However, liquidation of the various assets, principally Canadian bonds, enabled the parent company that financed the Mandy enterprise to the extent of $248,938, to recover the amount and a "plus" worth $89,000. The details of Mandy operations are

	1921	1920
Working capital	$536,513	$188,581
78.6 p.c. to Tonopah Mining Co	121,500	118,000
Mine owes Tonopah Mining Co		248,938

GOLDALE AND HOLTYREX

Contact conditions in the Pearl Lake Section of Porcupine are receiving more attention since the Nipissing Company drilled the Rochester Veteran claim and got what pioneer holders of the ground did not find because the geological features had not been accurately defined. Location of the contact and the subsequent drilling seem to have started another mine where it was to be had for thirteen years.

The Pearl Lake Company ground merged in the McIntyre was the victim of mismanagement. It had a contact, and a lot of drilling and development work were done; there was a lively speculation in the shares, but claims of tonnage and values were not sustained; hence liquidation. Presence of the contact of the greenstone schist and porphyry was not conceded due importance.

What happened in this immediate vicinity, the gold output of the McIntyre Company has placed beyond dispute. Not only in the McIntyre ground but also in the Jupiter, the "Pearly Schist" bugaboo lost its significance. For years it was assumed by the Jupiter management of the time, that the contact ran through the centre of the property, or thereabout. The Jupiter management fatuously avoided the western end of the property, notwithstanding which it has transpired that ore bodies exist there, which now are yielding a considerable tonnage.

In connection with this, the latest McIntyre report had a map showing a plan of the lower levels and contacts which lend speculative interest to properties to the immediate east and northeast, notably the Plenaurum and Holtyrex. Though the McIntyre map is presumed to correctly represent the underground contact conditions down to the lowest levels as they were a year ago, it has occasioned no public comment that the contact swings around to the northeast toward the Holtyrex. This gives a status unthought of heretofore, to a section that has lain fallow. If, as is declared, they have located outcrops of prophyry-schist there, it may mean the existence of the coveted contact. Mineralized schist over a width of about 96 feet is reported, consequently the diamond drill core obtained by Captain Anchor about 300 feet East of the Holtyrex boundary may have more significance than was attributed to it at the time. At any rate the area has come under careful consideration.

More immediately important is the alignment of the Kerr Lake Lewisohn interests with the Goldale Company areas formerly held by Bewick Moreing. Some of these areas are close to the McIntyre Holtyrex on the northwest, and the Plenaurum-Platt on the east. General Manager Kee, it is understood, will have charge of the Goldale work, which means that it will be thorough. The Goldale property on the eastern axis of Pearl Lake was drilled a year or two ago and the results were said to be encouraging.

"A MINE" BUT!

"While this is a mine, and therefore not what we would consider the highest class of investment," writes a reputable Montreal private banking firm, yet the Asbestos Corporation balance sheet "is well worth while," and investors should "look into it."

Mining scientists and capitalists acknowledge this as among the "small favors thankfully received." Asbestos Corporation, with all due respect to the bankers, is not "a mine." It is the chief factor in the [illegible]

tes industry and possesses a series of mines. At those mines there are known assets, just as there are timber limits and pulpwood assets, and fields that ensure the operations of our flour mills. Neither is inexhaustible. All are dependent upon markets. Enough drilling has been done by the Asbestos Corporation, and enough ore was been disclosed to provide a stronger Rest Account than some banks have had of late.

MINING "BOOMS" BEING GROOMED.

Montreal, like the familiar infant that "won't be happy" until it has a certain brand of soap, has clamored for the revival of the local Mining Exchange, which will at least give the unemployed of the previous organization of this sort a livelihood, even if it leaves the venturesome section of the public without their petty cash. Formerly the Montreal Exchange traded in whatever came along, "and no questions asked". A list of the "securities" of those days looks like a deserted graveyard. My fyles contain what resembles a roster of slain. So keen was the competition, the crudest of bucket shops could not exist unless it went "into the mining game." When there was nothing to be gained by sending the bucket to the public well, mining brokers had to devise other means. If it was not oil, it was anything that could be dressed up. The example set by international curbsters was availed of, and the recent crusade in the States and here induced a goodly number (though not quite enough) to emulate the Arab and quietly fold their tents.

Nor are Montreal, New York and Toronto to have a monopoly of the mining business. London is not overlooking developments, hence this gratuitous gibe appearing in The Daily Mail:

"While there is hope for the employment of British capital in developing Canada's mineral resources, it cannot be said that British investors have fared at all well with Canadian mining ventures in the past, and caution is as necessary as ever. Several Canadian gold mining flotations are being prepared for submission to British investors, and we hear of people being circularized in vague terms to arouse interest."

There is a large and unpalatable mouthful of truth in this comment. London is receptive toward Canadian mineral resources, but London has yet to convince those deeply concerned with constructive Canadian enterprises that it is any more circumspect than other centres. Of late there has been abundant evidence of this. Propositions have been entertained over there that the fully-informed on this side would not accept. Of all the London undertakings at Cobalt, but one, the Trethewey, brought any satisfaction, and it was managed by long-distance until the Watsons pulled it out of the mire. Further back, London took on the Lorrain and other sad ventures. When Porcupine was discovered, the experience with London was not flattering to its honesty of purpose or to its technical efficiency. It is better to be frank about this. Overseas mining highbrows shrugged their shoulders or sought a quick profit. London's failure to participate in Hollinger was excused hurriedly. London took a bit of Rea, and an eruption. London had the Scottish-Ontario, and was nauseated next morning. The McIntyre was proffered and rejected. London compromised on The North Thompson. Dr. Simon was commissioned to come all the way to inspect the work on the Feldon ground in the "lemon belt." "England's Premier," located in the Moose Mountain locality on the Montreal river, was really "England's Dernier," in that quarter.

No one on this side was deceived by these happenings. London can be incorrigible, without any assistance from Canada. Now that Kirkland Lake is showing its real values, it would be positively unkind to revert in detail to London's acquiescence in an unfortunate episode. Nor was the Daily Mail exempt from culpability in that case.

By all means, let there be caution. That will encourage the real capital Canada seeks, not for "turnover," but rather for the potential mines, which deserve more than transient interest.

CANADIAN OIL OUTLOOK.

Elder Statesmen at Ottawa have extended leave in the matter of their investigation of the New Brunswick Oil Shales. Like Tennyson's brook they are going on forever, though why those shales should be in suspense when the Anglo-Persian people have been testing them for years and others have held a blanket concession over them for ever so long, is unexplained. At present there is an over-production of oil, and by-products are hard to sell. Perhaps this explains the senate's action. Maybe a special consideration for those that will work the shales, will be in order. The area certainly has been fully proven and the terms of the grants are not at all onerous; but if it takes so long for the Honorable Senators to report on the shale, how long long will it be until a thought is given to the situation in the Canadian West and Northwest?

International oil corporations are contesting for a slice of Persia and Mesopotamia. They have acquired millions of acres in Columbia and Peru. Venezuela is being investigated. Rumania has been parcelled out. Only the Imperial Oil Company and one other, a stray lot of capital, have made earnest efforts to find productive wells in Canada. Although the daily average production in the United States is greater than ever, as well as the imports and although the price of crude makes the existence of the small fry precarious, American oil interests are taking on territory wherever there are prospects. The only manifestation of activity in the Dominion is that of the Imperial company and the Senate's Commission referred to, unless it be by the promoters of the Lake Pakowki concession in Southern Alberta. These latter contract to drill wells on a partnership basis, after a first section has yielded oil. To that extent there is a possibility of something being done to supplement the extensive work patriotically prosecuted by the Imperial company. Beyond that, Ottawa has not moved, and the years are passing since the Fort Norman prodigy came in. The Pakowki arrangement is a precedent indicating an intelligent attempt on the part of the Minister of the Interior to remove restrictions and give speculative capital a chance to make some money for both parties. A similar plan two years ago, entered into by the Government and influential, oil-operating corporations, would have cleared the atmosphere instead of leaving it more beclouded.

Asbestos mining is considered to be one of the coming industries of South Africa. The asbestos occurs in a belt of hills, known as the Asbestos Mountains, extending roughly from Prieska to a little north of Kurumon. Little development work has been done as yet, due to lack of cheap power.

British Columbia Letter

MINING men in the West are on their toes in anticipation of the early opening of navigation in the Yukon and Alaska, as well as in the active camps of northern British Columbia. The annual flow of prospectors and operators who have been wintering in Vancouver, Victoria, and Seattle, has started northward. Outbound steamers are crowded already and the bookings on Canadian, as well as on American ships scheduled to leave during the next few weeks have been so brisk as to put accommodation at a premium.

While Atlin, Dease Lake, Alice Arm and other well-known and long popular districts are attracting their quotas, most of the travelers are *en route* either to the Portland Canal region or to the Mayo Camp. Up to the present the majority favor the latter section. The rush to that famous silver producing camp close to Dawson City has started early through a desire to get in over the snow, for when the break comes it will be some time before the roads or trails are in good condition.

Good Reports from Mayo.

Meanwhile the reports from Mayo continue to be favorable. It is said that new strikes have been made on Keno Hill and that high grade veins have been opened on the Croesus, Crystal Gulch, Gambler Gulch, Slate Creek and Stone Claims. The Slate Creek company is opening up a vein five feet wide of steel galena at a depth of sixty-five feet. The Yukon Gold Company is shipping three thousand tons of ore from vein number nine on the Rico Claim. At a depth of three hundred feet the ore is reported to be richer than nearer the surface. On the Sadie claim the Treadwell people have two shafts down about a hundred feet. This company has several million tons of ore blocked out on the McQuest—Cenelop Group. The vein on this property is said to measure three feet in width and to carry ore averaging from two to five hundred ounces of silver to the ton.

Construction of a new steamer at Mayo has been started by the White Pass & Yukon Railway Company to handle the business of the Camp.

The judicial committee of the Privy Council has refused the application of Anna Theresa Boyle to two placer mining claims on the Klondike River, thus sustaining the decision of a Dawson Mining Recorder. This ends litigation that has been carried from court to court for several years. Some valuable gold property, as a result of the judgment will go to the Canadian Klondike Company Ltd.

The Del Ecuador Mines Company, with a considerable block of leases in the Cedar Creek Section of the Cariboo, is reported to be making arrangements for putting a dredge on the ground this year.

Joseph Tretheway, who recently bonded the discovery claims, Iron Creek, Taseko (Whitewater) River Lillooet District, is reported to have shipped a diamond drill outfit to Williams Lake by the Pacific Great Eastern Ry. Thence it will be taken across ice and snow by way of Hanceville into the Whitewater and set up ready for work as soon as weather permits. With this equipment it is proposed to thoroughly prospect the telluride formation reported to be rich in gold. It is as a result of the accounts of recoveries made from this property by a miner named Taylor last summer that so much interest is being taken by prospectors in this region.

On Cherry Creek, a placer and quartz gold mining district near Kamloops, a Seattle syndicate has staked a number of claims and already has a crew of men on the ground. Placer ground, it is said, is to be opened up by means of hydraulicking while some lode prospects are to be explored by diamond drill.

There is activity of a similar character on Shorts Creek, west shore of Okanagan Lake. In this case, however, interest is being manifested exclusively in the placer possibilities.

It is reported that a Keystone Drill will be put to work on the Prince of Wales Mining Company's leases, Horsefly Creek, this summer.

The Indian Mines Ltd. and adjacent claims, situated in the Salmon River Valley, Portland Canal, have been acquired by G. D. B. Turner and associates. This property is northwest of the Premier Mining Company. The work so far done shows a vein from 6 to 11 ft. wide with fair gold and silver values, and in places considerable galena. The latter is uniformly low in silver. The camp is well established and development will start as soon as the season opens.

H. S. Munroe, general manager of the Granby Consolidated Mining, Smelting & Power Co. Ltd., has returned to Anyox after a trip to California. He announces that it is the intention to build a short railway to the site of the dam which the Company is to construct in order to assure a constant and ample supply of water for purposes of operation. Recent heavy rains have improved the situation in the district of the Hidden Creek Mine and the Anyox smelter. For a week the work was seriously interfered with because of lack of water.

Shipments to the Trail Smelter of the Canadian Consolidated Mining & Smelting Co. totalled 10,131 tons during the first week of March. Of this 5,008 came from the Arlington, 21 from the Ottawa, 10 from the Paradise, 33 from the Lilac, and the remainder from mines of the company. The year's receipts total at about 71,824 tons.

Col. R. H. Palmer, chief forest [illegible] in northern Alberta, recently made some observations concerning present conditions at Cadotte Lake and the prospected [illegible]. If Peace Chaps proves to be commercial oilfield [illegible] and will spread north to the Fort Norman field. At present there are [illegible] at Pine Cairn and the possibilities are great but whether the results to date can be considered satisfactory or not cannot be ascertained. The [illegible] of Company [illegible] little, although it is established that there has been a strong outflow of oil at the well and the volume of work done is sufficient encouragement to warrant the continuance of operations by the company. Col. Palmer said that a new [illegible] will be made

some have been drilled in the Pouce Coupe district. It was found that several parties have been holding leases, paying taxes on them, but not developing. As this was to no real purpose "community" wells were drilled, the cost to be paid by the various leaseholders in lieu of taxes and each possessing a proportionate interest in the well. The plan seemed to be working satisfactorily.

Pacific Coal Trade Light.

The coal business of Vancouver Island has been suffering by season of the strike of Chinese seamen at Hong Kong. Most of the Canadian Pacific Steamship Company's ocean liners were tied up at Oriental ports for weeks unable to get away because of the refusal of these men to go to work. Consequentely there has been little or no bunker trade. In fact it is stated that during February not one large ship took on coal at the bunkers of the Canadian Collieries (D) Ltd. and that the same condition continued until within a few days ago, the 14th March.

The slackness of this branch of the coal business, however, is not altogether accounted for by the strike. It is noted that recently vessels bound from the Orient to America have not carried full cargoes. In order to fill unoccupied space, and for the purpose of so trimming the ship as to secure the most satisfactory sea-going qualities, coal has been taken on in the East. This has happened more than once and again the Canadian operators have found their usual market cut from under their feet.

The domestic trade has been steady. The winter in the Pacific Northwest has been longer and colder than is customary and the demand for fuel has been well sustained. Consequently the mines, although not working to capacity by any means, have been kept in operation.

Labor Dispute in Western Coalfields.

Unless something intervenes, of which there is no present indication, the operators and the coal miners of District 18 (Province of Alberta and Eastern British Columbia) will be joined in industrial battle on the 1st of April next. On that date the existing agreement expires. The employers are asking the men to accept substantial reductions in wages and a general rearrangement of the understanding that now exists. The United Mine Workers of America have refused to consider the proposals. The Western Canada Coal Operators' Association a few days ago made the announcement that all negotiations have been broken off. Robert Livett, international board member of the U. M. W. of A. has said that "everything now is up in the air." From the Crow's Nest Pass the word received is to the effect that nothing is being done to bring together the two parties to the issue. The operators of District 18 appear to be prepared to close down the mines and the miners seem determined to strike rather than to accept the changes. A bitter struggle is anticipated.

Dr. J. D. MacKenzie, head of the British Columbia Branch of the Canadian Geological Survey, is in Ottawa, to confer with Dr. Charles Camsell, Deputy Minister of Mines, Ottawa, and other officials regarding the plans of the Canadian Geological Survey for field work in this Province during the coming summer. He has also attended the annual meeting of the Canadian Institute of Mining & Metallurgy.

H. S. Munroe, General Manager of the Granby Consolidated Mining & Smelting Company, Ltd., has left on a visit to California.

A. M. Haor of Seattle, Wash, who bonded the Bear and Wolf groups on Maroon Mountain near Kitsumgallum Lake is adding two more Ross Mills to the one installed last year, the one mill being found insufficient to deal with the quantity of ore that has been developed.

Fred A. Starkey, a leading British Columbia delegate to the International Mining Convention at Spokane, states that the meeting was very successful, that its educational features were noteworthy and that it afforded the opportunity to renew acquaintanee with representatives of the mining industry of the Northwest. The mineral exhibit from the Kootenays attraeted much attention.

DELORO SMELTING AND REFINING CO.

The branch office of the Deloro Smelting and Refining Company, Ltd., of Deloro, Ontario, which has been in Toronto since the inception of the enterprise in charge of Mr. Thomas Southworth, Managing Director of the company, has been removed to Ottawa, and is now located in the Bank of Nova Scotia Building, 114 Wellington Street. Hon. M. J. O'Brien is President and Mr. J. A. O'Brien, Vice-President of the Deloro Company, and the removal of the Managing Director and branch office from Toronto to Ottawa consolidates control with the head office of M. J. O'Brien, Limited.

OBITUARY.

Henry Cecil.

The tragic death of Mr. Henry Cecil, who for some years has been a well-known figure in Northern Ontario mining, is announced in the Toronto papers. Mr. Cecil was killed in a hotel-elevator accident at the King Edward Hotel, Toronto. The operator of the elevator is being held under heavy bail. Mr. Ceeil, formerly an Australian mine operator, was one of the most active and picturesque of all Northern Ontario's mining promoters. He possessed, in rare degree, the initiative and courage of the older type of mining adventurer. Long experience in Australia and other countries had qualified him for the part he played in Ontario. Of late years he had made Barrie, Ont., his home. The Canadian Mining Journal proffers its sympathy to Mr. Cecil's widow.

Philip Argall.

The death occured in Denver on March 19th., of Philip Argall, mining engineer and metallurgist.

The late Philip Argall was a native of Belfast, Ireland. Coming to the United States in the year 1887, he established the firm of Philip Argall and Sons. His contributions to technical literature were numerous and greatly valued. He was a member of the leading professional bodies of Great Britain and America. As a keen analyst of metallurgical processes, he attained a great deal of prominence.

The Canadian Miners' Buying Directory.

Acetylene Gas:
Canada Carbide Company, Ltd.
Prest-O-Lite Co. of Canada, Ltd.

Acetylene Welding:
The Toronto Iron Works, Ltd.

A.C. Units:
Powley & Townsley, Limited.

Agitators:
The Dorr Co.
Can. Chicago Bridge & Iron Co., Ltd.
Horton Steel Works, Limited.

Air Compressors:
Bellies & Morcom, Ltd.
Laurie & Lamb
Sullivan Machinery.

Air Hoists:
Canadian Ingersoll-Rand Co., Ltd
Mussens, Limited.

Air Receivers:
The Toronto Iron Works, Ltd

Alloy and Carbon Tool Steel:
Peacock Brothers Limited.

Alternators:
MacGovern & Co

Aluminium:
Spielman Agencies, Regd

Amalgamators:
Northern Canada Supply Co.
Mine and Smelter Supply Co
Wabi Iron Works.

Antimony:
Canada Metal Co.

Antimonial Lead:
Pennsylvania Smelting Co

Assayers' and Chemists' Supplies:
Dominion Engineering & Inspection Co.
Lymans, Limited
Mine & Smelter Supply Co
Pennsylvania Smelting Co.
Stanley, W. F. & Co., Ltd

Ash Conveyors:
Canadian Link-Belt Company

Ashes Handling Machinery:
Canadian Link-Belt Co., Ltd

Assayers and Chemists:
Milton L. Hersey Co., Ltd
Campbell & Deyell
Ledoux & Co.
Thos. Heys & Son
C. L. Constant Co.

Asbestos:
Cheritt & Co.

Balls:
Hull Iron & Steel Foundries, Ltd
Peacock Brothers Limited.
The Wabi Iron Works.
The Hardinge Conical Mill Co
The William Kennedy & Sons, Ltd.

Ball Mills:
Hardinge Conical Mill Co
Hull Iron & Steel Foundries, Ltd
Mine & Smelter Supply.
The Wabi Iron Works.

Babbit Metals:
Canada Metal Co.
Hoyt Metal Co

Ball Mill Feeders:
Hardinge Conical Mill Co
Hull Iron & Steel Foundries, Ltd
Mine & Smelter Supply

Ball Mill Linings:
Hardinge Conical Mill Co
The William Kennedy & Sons, Ltd
Penrock Brothers, Limited
Hull Iron & Steel Foundries, Ltd
Mine & Smelter Supply.

Balances — Assay & Analytical:
Mine & Smelter Supply
The William Kennedy & Sons, Ltd

Belting—Leather, Rubber and Cotton:
Canadian Link-Belt Co., Ltd
Northern Canada Supply Co
Jones & Glasco.

Belting:
R. T. Gilman & Co
Gutta Percha & Rubber, Ltd

Belting—Silent Chain:
Canadian Link-Belt Co., Ltd
Hans Renold of Canada, Limited Montreal.
Jones & Glassco (Regd.)

Belting (Transmission):
Goodyear Tire & Rubber Co

Belting (Elevator):
Goodyear Tire & Rubber Co

Belting (Conveyor):
Goodyear Tire & Rubber Co
Gutta Percha & Rubber Ltd

Bins and Hoppers:
The Toronto Iron Works, Ltd.
Can. Chicago Bridge & Iron Co., Ltd.
Horton Steel Works, Limited.

Blasting Batteries and Supplies:
Canadian Ingersoll-Rand Co., Ltd
Mussens, Ltd.
Canadian Explosives, Ltd.
Powley & Townsley, Limited.

Bluestone:
The Consolidated Mining & Smelting Co
The Conlagas Reduction Co., Ltd.

Blowers:
Canadian Fairbanks-Morse Co., Ltd
Northern Canada Supply Co.

Boilers:
Canadian Ingersoll-Rand Co., Ltd
Marsh Engineering Works
R. T. Gilman & Co.
The John Inglis Company
Wabi Iron Works.
The William Kennedy & Sons, Ltd.

Blue Vitriol (Conlagas Reg):
Canadian Fairbanks-Morse Co., Ltd.

Borts and Carbons:
Diamond Drill Carbon Co.

Boxes, Cable Junction:
Standard Underground Cable Co of Canada, Ltd
Northern Electric Co., Ltd.

Brazilian Rough Diamonds:
Diamond Drill Carbon Co

Brazilian Mica:
Diamond Drill Carbon Co

Buggies, Mine Car (Steel)
Hendrick Manufacturing Co

Brazilian Balas:
Diamond Drill Carbon Co.

Brazilian Rock Crystal:
Diamond Drill Carbon Co.

Brazilian Tourmalines:
Diamond Drill Carbon Co

Brazilian Aquamarines:
Diamond Drill Carbon Co.

Bridges—Man Trolley and Rope Operated—Material Handling:
Canadian Mead-Morrison Co., Limited

Bronz, Manganese, Perforated and Plain:
Hendrick Manufacturing Co

Buckets:
Canadian Ingersoll-Rand Co., Ltd
R. T. Gilman & Co.
Hendrick Manufacturing Co
Canadian Link-Belt Co., Ltd
Marsh Engineering Works
Mussens, Ltd.
MacKinnon Steel Co., Ltd
Northern Canada Supply Co.
The Wabi Iron Works
The William Kennedy & Sons, Ltd

Buckets, Elevator:
Canadian Link-Belt Co., Ltd
Hendrick Mfg. Co
Peacock Brothers Limited
The William Kennedy & Sons, Ltd

Cable—Aerial and Underground:
Canada Wire & Cable Co
Northern Canada Supply Co
Standard Underground Cable Co. of Canada Ltd
Peacock Brothers, Limited

Cableways:
Canadian Mead Morrison Co., Limited
Fraser & Chalmers of Canada Ltd
Mussens, Ltd
The Wabi Iron Works
R. T. Gilman & Co

Gages:
Canadian Ingersoll-Rand Co. Ltd. Montreal Que
Northern Canada Supply Co
Fraser & Chalmers of Canada Ltd
The Mine & Smelter Supply Co
Mussens, Ltd.
The William Kennedy & Sons Ltd

The News of Mining

The situation as regards labour in Canada is improving steadily. Official reports issued by the Department of Labour, Ottawa, show that amelioration set in as early as February of this year.

The work of Mineral Separation, Limited, England, in adapting froth flotation to the cleaning of coal has met with considerable success. Granular coals seem more amenable to this treatment than do coals in a finely ground condition.

Ducktown, Georgia, farmers within the area affected by fumes from the plant of the Ducktown Sulphur, Copper and Iron Co., have come to an agreement with that company whereby the latter agrees to permit the escape of gases containing not more than 40 tons of sulphur per day.

In the year 1915 the Government of New Brunswick introduced a portable limestone pulverizer to demonstrate to their farmer constituents the use of limestone as a fertilizer. Last year, working in conjunction with the railway authorities, the Government was instrumental in installing at Brookville, a modern crushing, pulverizing, screening and sacking mill. The machinery was supplied by the Sturtevant Mill Company, Boston. During the year, pulverized limestone to the amount of 6,666 tons was supplied to farmers at very moderate cost.

The Canadian coal miner is not a hardly-used worker. Last year the average daily (8-hour) earnings of contract miners in Nova Scotia were $6.66. Twenty-one years ago the corresponding figure was $2.27 per day. In Alberta and British Columbia the figures last year were higher than in the east, being respectively $9.57 and $8.34 per day.

Occupation of the Baku oil region by Bolshevik forces occurred a second time during April, 1920. The oil industry was then nationalized. Since then production per employee and drilling average per man have steadily fallen. At last reports monthly production amounted to about half of that reported five years ago. Labour efficiency has lessened to from one-third to one-quarter its former standard.

The Norwegian Government is seeking to introduce legislation establishing compulsory arbitration in labour disputes.

The Johannesburg strikers (or insurgents) have cost the citizens of the Union more per capita than the great coal strike cost the citizens of Great Britain per capita. Wages were higher on the Rand before the strike than in any other part of the world.

The president of the United Mine Workers announced on March 20th that approximately 600,000 bituminous and anthracite coal miners would be called out on strike in the United States and Canada on April 1st. It is not yet known if the coal miners of Nova Scotia will join the strikers. U.M.W. officials assert that 600,000 miners will respond, and that 1,500,000 workers in other industries will be affected by the shut-down.

To prepare for the strike of coal miners, which is announced for April 1st., Canadian consumers are negotiating for supplies from Great Britain.

In the coal mining regions of North Wales, there are still large numbers of unemployed. In South Wales conditions are favourable, especially in the steam coal trade.

Sir John Cadman, president of the Institution of Mining Engineers of Great Britain, recently emphatically denied that the British Government is engaged in the oil business, or that it is discriminating against United States citizens, or that it is attempting to monopolize the petroleum resources of the world. This should "lay" a number of ghosts.

Competent authorities agree that the market for copper is gaining strength constantly and will become normal sooner than might have been expected a short time ago. Domestic consumption in the United States now exceeds 90 per cent of the maximum pre-war years.

Recent official estimates state that of the iron ore resources of Europe, France controls 35.2 per cent.; the United Kingdom, 18.2 per cent.; Sweden, 12.5 per cent.; and Germany, 11.1 per cent. The estimates include "known," "probable" and "possible" ore. Of the "known" ore, France now possesses nearly 50 per cent. The present situation marks one of the most radical changes wrought by the war.

The output of iron ore, per man per year, is extraordinarily high in the United States, reaching the figure of 590 tons. In Europe, the Swedish miner holds highest position, with 395 tons per year to his credit; whilst Germany is lowest, with only 92 tons per year as the miner's average production.

The Government of Western Australia has for a number of years operated "State Batteries" for the benefit of deserving mine owners. During the year 1920, the gold ore milled amounted to nearly 40,000 tons. The loss in milling (including rebates allowed to owners under the Development of Mining Vote) averaged somewhat more than $1.00 per ton of ore. Including slimes, tin ore, and scheelite, 73,300 tons were handled at a cost of less than $3.00 per ton.

In Germany there has been developed a method of producing crude sulphur from gypsum and anhydrite. The first step is the reduction of these minerals to calcium sulphide. The sulphide is then disintegrated with magnesium chloride lye to form sulphuretted hydrogen, which, in turn, is converted into sulphur by burning. About 60 per cent. of the available sulphur is recovered. It is expected that this recovery will soon be materially increased.

Under French administration, the collieries of the Saar valley have been brought up almost to the pre-war maximum production.

Canadian Miners' Buying Directory.—(Continued

Cables—Wire:
Standard Underground Cable Co of Canada, Ltd.
Canada Wire & Cable Co.
R. T. Gilman & Co.

Cable Railway Systems:
Canada Wire & Cable Co.

Cam Shafts:
Hull Iron & Steel Foundries, Ltd
Peacock Brothers Limited.
The William Kennedy & Sons, Ltd.

Car Dumps:
Sullivan Machinery Co.
R. T Gilman & Co.

Carbids of Calcium:
Canada Carbide Company, Ltd.

Cars:
John J. Gartshore
MacKinnon Steel Co., Ltd.
Northern Canada Supply Co.
Marsh Engineering Works
Peacock Brothers, Limited
Mussens, Limited
Powley & Townsley, Limited.
R. T. Gilman & Co.
The William Kennedy & Sons, Ltd.

Car Wheels and Axles:
Canadian Car Foundry Co., Ltd.
Burnett & Crampton
Hull Iron & Steel Foundries, Ltd
John J. Gartshore
Marsh Engineering Works, Ltd.
Peacock Brothers Limited.
The William Kennedy & Sons, Ltd.

Carriers (Gravity):
Jones & Glassco

Castings—Brass
The Canada Metal Co., Ltd

Castings (Iron and Steel)
Hull Iron & Steel Foundries, Ltd
Peacock Brothers Limited.
The William Kennedy & Sons, Ltd.

Cement Machinery:
Hadfields, Limited
Hull Iron & Steel Foundries, Ltd.
Burnett & Crampton
The William Kennedy & Sons, Ltd.

Chains:
Jones & Glassco
Northern Canada Supply Co.
Canadian Fairbanks-Morse Co., Ltd
Canadian Link-Belt Co., Ltd.
Greening, B., Wire Co., Ltd.

Chain Drives:
Jones & Glassco (Regd.)

Chain Drives—Silent and Steel Roller:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal, Q
Jones & Glassco) Regd.).

Chemical Apparatus:
Powley & Townsley, Limited.

Chemists:
Canadian Laboratories
Campbell & Deyell
Thos. Heyes & Sons
Milton Hersey Co.
Ledoux & Co.
Constant, C. L. Company

Chrome Ore:
The Electric Steel & Metals Co.
Everett & Co.

Classifiers:
Mussens, Limited
Fraser & Chalmers of Canada, Ltd
The Wabi Iron Works
R. T. Gilman & Co.
The Dorr Company

Clutches:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal, Q

Coal:
Dominion Coal Co.
Nova Scotia Steel & Coal Co

Coal Cutters:
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd
Peacock Brothers, Limited

Coal Crushers:
Canadian Mead-Morrison Co., Limited
Canadian Link-Belt Co., Ltd
Peacock Brothers Limited

Coal Mining Explosives:
Canadian Explosives, Ltd
Giant Powder Company of Canada, Ltd

Coal Mining Machinery:
Canadian Rock Drill Co
Denver Rock Drill Mfg Co., Ltd
Canadian Ingersoll-Rand Co., Ltd.
Sullivan Machinery Co.
Marsh Engineering Works
Hadfields, Ltd.
Hendrick Mfg. Co.
Powley & Townsley, Limited.
Mussens, Limited

Coal and Coke Handling Machinery
Canadian Link-Belt Co., Ltd.
Powley & Townsley, Limited.

Coal Pick Machines:
Sullivan Machinery Co.

Coal Screening Plants:
Canadian Link-Belt Co., Ltd.

Cobalt Oxide:
Conlagas Reduction Co.
Everitt & Co.

Compressors—Air:
Smart-Turner Machine Co.
Canadian Ingersoll-Rand Co., Ltd
Mussens, Limited
Peacock Brothers, Limited

Concrete Mixers:
Gould, Shapley & Muir Co., Ltd
MacGovern & Co., Inc
Mussens, Limited

Condensers:
Smart-Turner Machine Co.
Northern Canada Supply Co
Belliss & Morcom, Ltd.
Laurie & Lamb
Peacock Brothers, Limited

Concentrating Tables:
The Mine & Smelter Supply Co.
Deister Concentrator Co.

Converters:
Northern Canada Supply Co
MacGovern & Co., Inc.

Conveyors—McCaslin Gravity Bucket:
Canadian Mead-Morrison Co., Limited

Contractors' Supplies:
Canadian Fairbanks-Morse Co., Ltd.

Consulters and Engineers:
Hersey Milton Co., Ltd.

Conveyors:
Canadian Link-Belt Co., Ltd.
Jones & Glassco (Regd.)
Powley & Townsley, Limited.

Conveyor Belts:
Gutta Percha & Rubber, Ltd.

Conveyor Flights:
Canadian Link-Belt Co., Ltd.
Hendrick Mfg. Co., Ltd.

Conveyor—Trough—Belt:
Canadian Link-Belt Co., Ltd
Hendrick Mfg. Co.
Mussens, Limited
Jones & Glassco (Roller, Belt and Chain)
Hendrick Mfg. Co.

Conical Mills:
Hardinge Conical Mill Co

Copper:
The Canada Metal Co., Ltd.
Consolidated Mining & Smelting Co.

Couplings:
Hans Renold of Canada, Limited, Montreal, Q

Cranes:
Canadian Mead-Morrison Co., Limited
Canadian Link-Belt Company
Peacock Brothers, Limited
R. T. Gilman & Co.
Smart-Turner Machine Co.

Crane Ropes:
Allan Whyte & Co.
Canada Wire & Cable Co
Greening, B., Wire Co., Ltd
Peacock Brothers, Limited

Crucibles:
The Mine & Smelter Supply Co.

Crusher Balls:
Canada Foundries & Forgings, Ltd
Hull Iron & Steel Foundries, Limited Hull Que
Osborn, Sam'l (Canada) Limited
Peacock Brothers, Limited
Swedish Steel & Importing Co., Ltd
The William Kennedy & Sons, Ltd

Crushers:
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd
Hardinge Conical Mill Co.
Lymans, Ltd.
Mussens Limited
Osborn, Sam'l (Canada) Limited
The Electric Steel & Metals Co., Ltd
R. T Gilman & Co.

Great Britain supplied Holland with 1,767,000 tons of coal during 1921. Germany and Belgium supplied, each, about 1,275,000 tons; the United States, 497,000; and Canada, 56,473 tons. From far South Africa came 10,800 tons.

Coal miners' working hours are gradually being standardized throughout Europe. In Spain a 7-hour shift obtains. In Poland the working shift is 8 hours, bank to bank. Here, however, the law was suspended by mutual agreement between employers and men, and a 10-hour shift was adopted for two years.

CONTRACT PRICES AT HOLLINGER.

At the Hollinger mine all development work is contracted. The price paid ranges from $10.50 per foot in the main drifts to $8.50 per foot in some of the crosscuts. All crosscuts are 8 ft. 6 in. high and 7 ft. wide. The contract price covers drilling, mucking and explosives. Explosives are charged at a fixed price of 16 cents for 1¼ in. stick 50 per cent and 14 cents for 40 per cent. The powder used on each drift by the blasting crew is posted each day so that the miners can check their expenses. A development crew consists of four men — two men drill a round in the afternoon shift and two clean out the drift in the morning shift.

Drifting is also done on contract at $9 per foot of advance of 6 ft. wide and $1.10 per ton for extra slashing. The taking down of backs to 17 ft. height is contracted at 85 cents per ton.

Diamond drilling is done by contract at prices from 80 cents to $1.10 per foot depending upon nature of the rock and percentage of core recovered. During 1921 the average paid was $1.04 per foot, and core recovery was 88 per cent.

CANADA'S
MINING
RESOURCES

* * *

In order to foster the development of Canada's mineral resources, this Bank is prepared to assist companies and individuals engaged in legitimate mining projects in every possible way.

Discuss the financing of your enterprise with our nearest Manager.

* * *

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OF CANADA

JUDICIAL SALE OF MINING PROPERTIES, PLANT AND EQUIPMENT.

IN THE SUPREME COURT OF ONTARIO.

IN THE MATTER OF PREMIER LANGMUIR MINES, LIMITED; AND IN THE MATTER OF THE WINDING-UP ACT AND THE AMENDMENTS THERETO.

Pursuant to the order for sale made herein, dated the 28th day of February 1922, there will be sold by public auction by the Liquidator, with the approbation of H. S. Blackburn, Esquire, Local Master of this Court at London, at his Chambers at the County Buildings, Dundas and Ridout Streets, London, Ontario, on Monday the 1st day of May 1922, at the hour of 3 o'clock in the afternoon, the following lands, buildings, mining plant and equipment, namely: those certain parcels of land situate in the Township of Langmuir in the District of Temiskaming (Ontario) and numbered 39, 40, 41, 42, 43, 44, and 4373 in the Register for the District of Temiskaming, containing two hundred and fifty-five acres more or less and being the mining properties formerly owned and operated by Premier Langmuir Mines Limited as a barytes property; together with the buildings, mining plant and equipment now on the said mining properties and heretofore used in connection therewith.

On the said lands are situate the following buildings: Mill Building, Engine House and Boiler House, Blacksmith's Shop, Superintendent's Office, Shaft House — all of which are protected by asbestos sheeting — Office, Storage Building, Bunk Houses with beds and bedding, Dining Camp with ordinary equipment and a stable. The Mill Building is equipped with the following machinery: Crusher, Dryer, Jiggs, Pulverizer and necessary shafting and pulleys. The Engine House is equipped with a Goldie-McCulloch Engine, 150 h.p. and the Boiler House contains a boiler of 125 h.p., a hoist and other equipment. There is an electric light and power plant, a tramway from the mine to the water, two horses and harness.

There are on the property about 125 feet of shaft work and about 250 feet of tunnelling and drifting.

The Liquidator has a letter from the Provincial Geologist, Ontario Department of Mines, stating that "the veins are strong and well defined and there is a large quantity of barytes in the deposits". There are showings of native silver and argentite in some of the veins. Photographs and descriptions are contained in some of the Government mining reports.

The lands are situate in the Township of Langmuir in the Porcupine Mining Division and are on the Night Hawk River about 30 miles from Connaught Station on the T. & N. O. Ry. and about 30 miles south east of Porcupine.

The property will be sold in one parcel.

Ten per cent. of the purchase money is to be paid down on the day of sale and the balance, over and above the amount which may be found to be secured by a mortgage on the said lands to secure a bond issue (which mortgage the purchaser is to assume), to be paid within thirty days after the sale or as soon thereafter as the amount of the mortgage is ascertained.

In the event of the amount of the mortgage not being ascertained within thirty days after the sale the purchaser shall, if required, pay such additional sum on account of the purchase money as may be fixed by the said local Master, having regard to the probable amount which may be found to be secured by the said mortgage, and upon such payment the purchaser shall be entitled to possession. Any balance remaining unpaid after the amount of the said mortgage is ascertained shall be paid forthwith thereafter.

The purchaser is to search the title at his own expense and fifteen days from the day of sale shall be allowed for that purpose and if any objection to or requisition on title is made within that time which the vendor is unable or unwilling to answer or remove the contract shall cease and the deposit money will be returned to the purchaser without interest. The vendor is not to be bound to furnish or produce any abstract of title or any proof or evidence of title other than those in his own possession.

In all other respects the terms and conditions of sale will be the standing conditions of The Supreme Court of Ontario.

Further particulars can be had from F. W. Raymond, Esquire, Liquidator of Premier Langmuir Mines, Limited, London, Ontario, and from Ivey, Elliott & Ivey, Esquires, London, Ontario, Solicitors, for the Liquidator.

Dated at London this 13th day of March, 1922.

H. S. BLACKBURN, Local Master, Middlesex.

EDITORIAL

CANADA'S COAL

THE modern colliery is the embodiment of a closely-run commercial enterprise. Net profits per ton of coal sold are small. Labour is the chief item of cost. Administration and other overload charges are relatively and absolutely small. Payment of interest on capital investment and of reasonable dividends is necessary to the continuance of all industries. Coal must be marketed in the face of strong competition.

Strange as it may seem, coal miners do not grasp the fact that, when they stop producing, they are piling up liabilities against the colliery, and thereby automatically reducing the chance of bettering their own condition. Every dollar of debt loaded on the back of the mine by this, as well as by other means, must be paid back through the agency of coal brought up from the mine.

Trite and axiomatic this proposition may be; yet it has not yet been borne in on the consciousness of the coal miners, whose lot, by the same token, is rather to be envied than pitied.

It is pitiful, it is amazing, that in these days when the machinery of the law will give him the fairest of fair play (for there is always a preponderance of sympathy for the employee as compared with the employer), the miner should deliberately choose to impose suffering, loss and privation upon the whole community. He seems to think—or to believe that he thinks—that by dislocating trade, causing large losses directly and huge losses indirectly to his own fellows and to the country at large, he can advance his personal interests.

We sincerely hope that the coal miners of Canada will **not** join hands with the strikers on the other side of the international boundary. There is, at date of writing, some reason to believe that they will not. By remaining at work they will do themselves infinitely more good than they could by any other means. The only disappointed persons will be those parasites that depend for their livelihood upon their ability to arouse class hatred.

PERSISTENCE OF ORE AT DEPTH

PRESIDENT TIMMINS' statement that the Hollinger plans have been made "in the belief that we should have ore at 3,000 ft." and that "after nine and a half years of operations we have seen no reason to change our opinion," should help the people of Ontario to appreciate more fully what opportunities there are for building up a great gold mining industry in the Province. When the Timmins-McMartin-Dunlap syndicate agreed to pay $330,000 to Ben Hollinger and his associates for the properties, they had no means of determining definitely the value of the property. There was some good ore exposed at the surface, but most of it was not rich, and there was no chance of shipping out a few carloads of high grade ore to pay for the property as was done at Cobalt. There were those who were convinced that the ore would not persist with depth. It was no place for pessimists. The men that made the Hollinger ventured a large sum of money, and the results show that the optimistic view was the correct one.

We are of the opinion that the possibility of making deep mines in Ontario has long been underestimated, and that even now, it is not yet sufficiently well-recognized. The success of Mr. Timmins and his associates was largely due to the fact that they would not believe that the chance section of the veins exposed by weathering and glacial action belied the character of the ore deposit. So much rot has been circulated about surface enrichment of ore deposits that there has been for years in Ontario an unwillingness to believe that the ore at surface has not been enriched in some way. This belief doubtless delayed development of many ore deposits, for where there is lack of faith there is lack of funds to develop mines. The results at Porcupine and Kirkland Lake have been enlightening and will have their effect on future operations.

In our view there is just as good a chance of Ontario gold deposits continuing to great depths as there is in the case of the Michigan copper and iron deposits, in spite of the sedimentary origin of the latter ore bearing beds. Individual ore shoots will terminate, and unfavourable geological conditions will in some cases reduce the value of the gold bearing zone to unprofitable dimensions; but the old fiction about surface enrichment can be safely discarded. It arose from close study by able men in districts that are quite different geologically from those of Northern Ontario. It is a safe guide in certain mining areas, but it has no place here. Such a belief in it is not in accordance with the facts disclosed by mining operations in Ontario, and can only result in underestimation of our mineral resources. We need more optimists like the members of the Timmins syndicate, not because they are optimists, but because their confidence in the persistence of such ore deposits in depth is a logical deduction from observed facts.

ENERGY.

NATURE has been rather indiscriminate in scattering her blessings over Central Canada. Particularly is this so in her provision of energy available for man's uses. Economists, practical and theoretical, are now hard at work studying the means of making our surplus of electric energy, available from water-powers, supply the deficiency of heat energy, due to the lack of coal deposits. This is a highly important problem; but we must not let it overshadow related problems of similar importance.

Throughout the country at large, the form of energy most in use and most prized and appreciated, is heat, as used in furnace, open grate and cook-stove. We may wish to have the convenience of railways, tap-water and electric toasters; but we *must* have heat for cooking and for warming our houses. The former are perquisites of civilization; the latter are pre-requisites.

The larger part of the dwellers in Ontario and Quebec still use Canadian fuel. The wood-lot is still an institution in our rural communities, and there is still sufficient wild land within reach of some of our towns and cities to provide a fraction of their needs. Properly conserved and regulated, the wood-lot will continue to fulfil its function indefinitely.

The urban communities, even those in the North country, draw their fuel supply mainly from the coal-fields of the United States. It is expensive fuel, but it is convenient, and cheaper than anything at present available from within our own borders. But the fact of dependence upon a foreign source of supply is unsatisfactory in different ways, and has lately caused a good deal of hard thinking and heart-searching. One result has been a renewal of the attempt to use peat.

The public have been ill-informed about the facts of the recent experimental work on peat; even technical men have failed to follow developments with the care the matter warrants. The result—the inevitable result—is that misconception has taken the place of truth; the forty devils have come in when they found the place unoccupied. The Journal deplores this result, and will do its bit to help mend the case.

We print today a resumé of what appears to us to be the present situation. We hope to keep the Journal's readers supplied, from time to time, with information on this important question. Those interested in the commercial supplying of fuel in Central Canada will do well to keep a shrewd eye on developments.

"PLAIN GEOLOGY."

OUR compliments to Dr. George Otis Smith Director of the United States Geological Survey. Our hat is off to him. Geology can be made so occult a science that only the elect can penetrate its arcana. The geologist can, and, to our grief, sometimes does, clothe himself with all the mystery and circumstance of the Delphic Oracle His polysyllabics are his protective armour, his weapons of offence, and the instrument with which he smites the Philistines.

Dr. Smith has rent the veil. Let us quote him, for we are ourselves becoming distended with words:—

"I am convinced that, at its best," says Dr. Smith in a current contemporary, "science is simple,—that the simplest arrangement of facts that sets forth the truth best deserves the term scientific. So the geology I plead for is that which states facts in plain words — *in language understood by the many rather than by the few.*"

We have taken the liberty of italicizing the last phrase because it is kernel of the nut. The hard-shelled geologist wishes to give to the public only his conclusions. He does not think the average citizen capable of following his reasoning. Further, he takes extremely good care, by using a terminology that is a fearful and wonderful complex of Latin and Greek derivatives, that none but the initiate *can* follow him. This may titivate the geologist's pride, but it pleases no one else.

Dr. Smith is a geologist himself, and this is what experience has taught him:—"It takes years for some "geologists to break the fetters of their scholastic " habit of using big words for small ideas."

We remember that in our early adolescence we were forced to learn by rote at definition of the term "word". The definition we shall never forget, flagellation having stereotyped it on the tablets of our memory. It ran thus:—"A word is a significant com-" bination of articulate sounds capable of being re-" presented by written characters." To our then untrained ears these sounds were significant of nothing. Other parts of our anatomy were appealed to.

Quite seriously, Dr. Smith has pricked a bubble, lanced a boil, and laid a ghost. We are thankful that in the matter of turpid terminology (we beg Dr. Smith's pardon,—we shall have said "long words"!) Canadian geologists are not as blameful as are their brethren in a mighty republic that shall be nameless.

FINE GRINDING OF GOLD ORE.

ALL interested in the treatment of gold ore will find a fund of information, well worth the closest study, in the papers presented at the recent annual meeting of the Canadian Institute of Mining and Metallurgy. Particularly instructive are the figures giving the comparative efficiencies of stamps and ball mills.

At the Hollinger, six ball mills followed by twelve tube mills do more work than 200 stamps and twenty tube mills, and consume less power. The cost in the former case is 26 cents per ton, and in the latter, 41 cents per ton. There is, therefore, little doubt as to

the character of the additional plant for fine grinding, shortly to be installed in the enlarged Hollinger mill. The ball mill has again proved itself eminently suitable for the gold ores of Northern Ontario.

As the main factor under consideration at the Hollinger just now is the provision of facilities for the treatment of more ore, it may safely be assumed that ball mills will, for some time to come, be used to supplement, and not to replace, the present batteries. Soon, however, the roar of the stamps will split the ears of visitors no more. Gold milling will have lost something of the picturesque, but the mill-man will appreciate the added comfort.

Thanks are due the managements of the companies that have made public, information that will assist materially in the rational design and economical operation of other and newer milling units in the growing gold-fields of Northern Ontario.

EDITORIAL NOTES

MCINTYRE-PORCUPINE shares are now selling at a figure that indicates a capital valuation of $16,000,000 for the mine. Those that buy the stock at the present figure (and hold it) will have to see the mine produce approximately $32,000,000 of bullion in order to realize a reasonable return on their investment. The last annual report of the notably capable General Manager placed the gross value of the ore reserves at about $6,000,000.

We refrain from pointing the moral.

A wonderfully interesting thing is the history of the stamp-mill. Originally, if records are to be believed, it was used for laundry purposes. The development of the device is one of the romances of ore-dressing. Yet, in essence, the stamp-mill is wasteful of power and ponderous in performance; and frankly mediaeval in design. The Journal invites comments from any of its readers that may think this statement too radical.

Time and time again the phenomenon recurs—the phenomenon of the investor buying an interest in a metallurgical process that has nothing to recommend it save the fantastic claims of its inventor. Processes, like all other expressions of human endeavour, are accretionary growths, evolutionary indeed, but rarely (if ever) revolutionary.

In mining, the corresponding phenomenon is commonly evident on the stock markets. Fancy, properly seasoned with the sauce of over-optimism, is made into a seemingly palatable dish by certain clever cooks. Some refuse to accept the poisoned delicacy; others eat, are nauseated, and clear their systems only after violent effort.

Until comparatively recently, it was considered that the potash-bearing salt beds of Alsace and of Stassfurt were unique, and were destined to supply the world's needs indefinitely. Now it appears that beds of similar geological occurrence, similarly rich and extensive, have been located and are under development in Spain.

The Malagash salt beds in Nova Scotia created quite a "furore" for a time when their content of potash become known. When drilling and similar exploratory work have been done, Canada may find herself similarly fortunate to Spain. Elsewhere in Canada, the possibility of finding high-grade potash salts can hardly yet be gauged.

Our friend, Professor H. E. T. Haultain, in an address, the text of which appears on another page, presents in his happiest and most whimsical style a topic that is of deep import. He invokes women's aid in developing a "tribal soul" in the engineering profession. For an alleged misogynist, this is going pretty strong. We commend the address to our readers' attention.

At last there is definite and decided action towards improving the salaries of technologists in government employ at Ottawa. For some time it has been generally recognized that the present scale of salaries to our highly trained scientists particularly in the Department of Mines, constitutes both a disgrace to the public service, and a danger to its efficiency.

The Hon. Mr. Stewart is to be heartily congratulated upon having spoken in an unequivocal way in favour of paying to our scientists in the public service a larger fraction of what they earn.

THE STRIKER

(Press despatches announce that 600,000 coal miners will go on strike on April 1st. It is expected that 1,500,000 workers will be thrown out of employment.

'Tis not enough that poverty and death
Stalk through the land. 'Tis not enough that war
Still hovers hateful in the West and East.
The STRIKER'S greed, his pride of power, his lust
For full dominion of our State and Realm,
These are insatiate. He must test his strength.
It matters not who suffer or who die.
He must impose his will upon the whole
Distracted body politic. Who cares
How many little children lack for bread?
How many homes destroyed, or broken hearts,
To blaze the progress of the glorious STRIKE?

* * *

Methinks that God reserves a special curse
For those inciting simple men to strike.

—ANON

The Romance of Engineering

By H. E. T. HAULTAIN*

Mr. Chairman, Ladies and Gentleman,
more particularly the Ladies:—

This is a meeting of more than ordinary interest. In the first place, it is part of an Annual Meeting being held at Headquarters. I am aware that Montreal draws a distinction between "Montreal Branch" and "Headquarters," and today we are are guests of the Montreal Branch, but they have interlocking directorates. Montreal has been Headquarters of the Canadian Society of Civil Engineers and the Engineering Institute of Canada ever since its inception thirty-five years ago, and it has been an autocratic Headquarters. Sometimes it has been considered an arrogant autocracy. It is well that it has been so, because we have been through our times of difficulty and trial when strength and persistence were needed. But it has been an autocracy of leadership rather than of domination. It has been an autocracy by virtue of influence rather than by virtue of jurisdiction.

Another reason why this is an important meeting lies in the fact that this is the only function of this Annual Meeting in which the ladies take part. Before I go any further, let me explain that I have persistently on every occasion possible opposed the idea of the ladies taking any part whatsoever in any of our meetings. I have used my best endeavour, and to be quite candid, I have considered that I had some ability in matters of this kind, but I have failed to have any influence on the course of events. I am quite sure that many members have entirely agreed with me, but hardly any of them, in fact none of them, have stood up openly and supported me. The only explanation that I can find for this is that they have been married twelve years, and apparently have still much to learn.

I have been making enquiries as to the advent of the ladies into our affairs and I find that the first occasion was in Ottawa four years ago, when there was a dance and a reception and an afternoon tea for the ladies. Those of you who have experience of official "Ottawa" know that there is a strange atmosphere at Ottawa and they do queer things. The next occasion was at the summer meeting at Niagara Falls when every meeting and function was open to the ladies. The Engineers, of course, have found some use for Niagara, but apart from that Niagara has only two functions, honeymoons and picnics, and this summer meeting was a picnic, and of course no picnic would be complete without the ladies. (Nor honeymoons either for that matter.) The next occasion was in Toronto last year when I put in my special efforts to keep them out, but I was a minority of one, nevertheless a solid minority. At this meeting the ladies or their friends butted and horned into everything they could and when this did not work they sat on the doorstep until they were invited in. There was a dance and a musicale, and a reception at Government House, and an afternoon tea, and this was not enough; they found their way into our Smoker, and some of them even into the holy of holies, the President's dinner. I think they thought this last was the unholy of unholies. It is perhaps note worthy that, though many meetings and functions were arranged for the ladies, at none of them were they welcomed. (Notice the "d" at the end of that word.) I mean, there was no official word of welcome, and as far as I was personally concerned, let me say it again, they were never welcome. Now we come down to this meeting and Headquarters has only invited the ladies to this one luncheon, and the amusement that they provide is a dry old professor from the dry town of Toronto. I am afraid they have rather put one over you. Probably they are putting one over me too, and have put me here to do penance in full public view for my attitude in this matter. Why is it that you ladies, or some of you at least, have been so anxious to mix in at our affairs? Is it that you think we are having too good a time and that you are entitled to your share, or is it that you know that we are having a smoke too much and perhaps a drink too much, and need looking after? Probably both of these, and also because the women of the present age have found great satisfaction in doing just those things they have been told they must not do. Having succeeded so well as far as you have gone, why not go to a lot further? There are all kinds of opportunity for you. You can form committees; you can be elected to office with all kinds of distinguishing names; you can hold meetings and have addresses and get your names into the social column to your hearts' desire. The road is all clear for you. The reputation of the Engineering Institute is at your disposal to play to the limit. You say that is not what you are after; that you would not seek social eminence in such a manner. You say that is not characteristic of Engineers' women-folk. I believe you. In fact, it is only because I believe that, that I have dared to take the extraordinary venture of appearing here to-day.

To be more serious (though I have been much more serious during the last few minutes than you have been inclined to believe), within the last few years I have seen miracles. I have seen a new phase of womanhood. I have seen women force their way into places and organizations where they were very much less welcome than you have been here. I have seen them force their way quietly into circumstances where they were openly damned and less openly, but just as severely, shown they were not wanted by the more subtle means of the cold shoulder and the sneer. I have seen them persist and in a very short time, a matter of only a few weeks, I have seen these same women welcomed with language of the very opposite extreme. I have seen language fail completely to express the feelings of blessings towards these women, and this not in isolated cases, but in hundred of cases throughout Canada. I am referring to the "Girls in Green." Some of you may have worn the green uniform in the hospitals, or some of your relatives or friends have I am sure, and you will know what I am referring to. I have seen what these girls accomplished, and I am prepared to believe anything possible, either as to the manner in which a woman gets into the game, or as to what she does after she has arrived there. What did these girls do? Well, they saved men's souls, thousands of them. I am not referring to the salvation of souls from the hell-fires of the future, but from the hell-fires of today. They saved that part of man which saves him from despondency and despair, which makes him feel a man, and makes him hold up his head, and makes him something in the com-

* A Luncheon Address at the Annual Meeting, Engineering Institute of Canada, Montreal.

munity. To most of these girls, this work and its results was true romance of a very deep kind, in many cases, I firmly believe, a truer and richer romance than the personal affairs of their own hearts.

What is it all about? Is it just simply to have a good time? Why are we here today? Why the Engineering Institute of Canada? Why these Annual Meetings with their serious scientific papers and serious discussions and their dinners and their smokers and their drinks?

All this effort and fuss is just for one purpose. It is for the purpose of developing a tribal spirit. It is for the purpose of developing the manifestation of a tribal soul. You don't like that use of the word soul; neither do I. Give me a better word. What do I mean by it? What is it that makes the McGill man hold his head up when he says "I am a McGill man"? It is the spirit of old McGill. The word spirit it not strong enough. I want something deeper. I want something with more deference attached to it. The soul of McGill is a magnificent asset. McGill has a magnificent principal. McGill has a magnificent staff. But a greater asset than either of these is this tribal soul which binds McGill men together. We go down to New York and we say "I am a Canadian," quietly, unostentatiously, and what is the result? We get deference. That illustrates what I mean by the tribal soul. We have a splendid Queen's spirit at Kingston and we have a splendid "School" spirit in Toronto. But the strange thing is, that we have nothing like the same spirit in the engineering profession as a whole, or at least we have not the same manifestation. There is no particular pride or uplifting when a man says "I am an Engineer," but unfortunately there is the feeling that the other chap is saying "He is only an Engineer." Now, this is what we have to remedy. With a proper development of the tribal soul we can become anything in the community. Without it, we are very little indeed, the majority of us are but hewers of wood and drawers of water — some possibly nothing but sounding brass.

Now there is your romance. Help us find our tribal soul. There is where you may play the game on a fine broad scale. That may be the real romance of engineering as far as Canada is concerned. How are you to go about it? I have not the remotest idea. I still have some shreds of wisdom hanging to me and I am not foolisr enough to attempt to tell a woman how to handle a man. Your chairman gave me just before I rose a very happy French proverb: "Ce que femme veut Dieu le veut," which he translates: "What woman wishes God wills." I am inclined to put it, "What woman wishes these days she gets." But I am inclined to place much more weight upon her thoughts; her serious thoughts; let us say, her heart thoughts. I think her wishes as far as we have been concerned were just simply to see what was going on. If she will think more seriously about the true romance, she may accomplish wonders; I have no doubt she will accomplish wonders.

Just one word more, not a word of advice, simply a suggestion, or rather a statement of fact. There are in this city about 200 young men graduating each year from the University into the profession at the most susceptible period of their lives, not conscious that there is such a thing as an Engineering Soul. Women could do anything with them.

AN INVITATION.

Here are words of wisdom from the modern prospector. "One lesson that Porcupine has taught us, is not to worry so much about locating spectacular gold showings, but to watch these contacts (porphyry intrusions in Keewatin greenstones, basalt, etc) for mineralized schist, and pan and keep on panning. Then, if the condition looks right, strip across the mineralized zones, and channel samples and get them assayed."

This is from Tom Saville, of Sudbury, who continues, "Just now I am working on a piece of geology that suits me fine—a long strip of volcanics flanked by the granite, with several intrusions and lots of life, movement, and sheared zones, and just enough gold to keep a fellow scratching. This particular place lies between Makawa and Gogama on the C. N. Railway, eighty miles north of Sudbury, and extends nearly east and west on both sides the track. I am scouting this country alone, and would be glad to see more prospectors here, who might help to reduce the deficit of the C. N. R. on this section."

PLACER GOLD IN NORTHERN ONTARIO

(Special Correspondence.)

A prospector just returned from the region south of Abitibi Lake where there has recently been a rush to stake for placer gold, describes the country where the gold has been found as a gravelly ridge running nearly north and south from the Township of Milligan on the north, then between Munro and McCool, and ending between Guibord and Michand. The ridge stands high above the sandy plain through which it runs. An old Westerner pronounces it "exactly like the gravelly bed of an old river," but the description tallies rather with that of a very long and large esker. "Ruby" sand (garnet) has been observed where the panning shows good values. Small round lakes are frequent (kettle lakes?), and clear springs flowing winter and summer are characteristic features. One prospector has run a tunnel into the ridge for seventy five feet and gets values varying from forty-five cents to twenty dollars a yard. Whereas only very fine gold is got by panning the sandy plain, the gravel of the ridge gives nuggets of considerable size. The direction of the ridge indicates its origin as glacial drift rather than pre glacial gravel left as in the cases of Quebec and British Columbia by the glacier riding over a narrow river-gorge transverse to its direction. There is a chance, however, that the subglacial river has done extensive sorting of drift moved a relatively short distance. The district in question is a few miles east of the Croesus Mine, which produced such phenomenally rich ore.

Two weeks ago, on page 152 there appeared a cut with the description "Little Tugger Hoist." The hoist illustrated is actually a Waugh hoist, the cuts having been inadvertently interchanged. To the average observer, the two pictures are indistinguishable, though of course the manufacturer of each sees special points in his own.

The shortage of supplies of gold in London owing to the Rand strike has caused a shipment of gold — worth $800,000 — to be arranged from the United States to Bombay. This is the first consignment of gold to be exported from the U. S. A. for some months.

Peat

A SURVEY of the status of peat as a fuel in central Canada is pertinent at any time. With the threatened cessation of our imports of coal, the present situation directs our attention with added force to an anomalous condition. We have a native fuel at our doors, yet have failed to use it. Attempts made by private enterprises having resulted unfortunately, public funds have been allotted and spent in an endeavour to solve the peat problem. For one reason and another, we (the public) have failed to follow the case closely, and have allowed misconception to take the place of fact in our minds.

There are now, within a radius of two hundred miles of the peat bog at Alfred, a good number of well-satisfied users of peat fuel, with an unsatisfied inward sensation like that of Oliver Twist—they want some more, please. Alfred is on the Canadian Pacific Railway, between Ottawa and Montreal; yet from as far away as Peterborough there is a demand for more peat, and still more, from people that have experimented with trial carloads. A complete statement of the facts of the case is not possible in the present instance; an illustration will have to suffice in the meantime.

Caledonia Springs, whence comes our main support and solace in these dry (or near-dry) days, is on the border of the Alfred peat bog. The bottling works is in Montreal. The Canadian Pacific Railway are the owners; as usual, they have not lost any chance for turning to account a natural resource. So we see "Caledonia Water" from coast to coast on the company's dining-cars, and find the healing waters broadcast throughout numerous parched provinces, in various guises and under various names.

The Canadian Pacific Railway employs, and has the hearty co-operation of a host of progressive Canadians.

One of these noticed that the recent experiments next door to Caledonia Springs seemed logical and well-conducted, and that the blocks of peat had an attractive appearance. He tried a little bit in his stove and fire-place, and it burned beautifully. On inquiring about the cost, he found it to be reasonable, and consequently the Company shipped a trial lot to the bottling works in Montreal. The peat burned well under the boilers, was convenient to handle, cost less than coal, and appeared to be a good investment. Some of the workmen tried it in their stoves and fire-places, and they and their wives asked for more. The management experimented on a number of their friends in the same way, with the same pleasing result.

It began to look as if there were here a real "find". The management brought two carloads of peat to Montreal last summer, conducted some simple and conclusive tests in comparison with coal, and now are convinced that Nature has not treated us so badly in the way of fuel in Ontario and Quebec as we have been accustomed to believe.

Air-dried machine peat can be cut, macerated, spread and harvested, and sold profitably at a rate not exceeding $5.00 per ton, f.o.b. cars—probably for less, eventually. It stands transportation well, is convenient to handle, is smokeless, leaves hardly any ash, and has a calorific value a little more than half that of good bituminous coal. It kindles easily, and burns freely. On account of its bulk, (somewhat less than that of dry beech or oak), and the speed of its burning, it is not suited for furnaces or fire-boxes required for heating purposes in severe weather. These have been designed for a more compact fuel, and will not hold enough peat to last over-night. But for use in mild weather, or in a grate or kitchen stove at any time peat is "hard to beat."

The facts of the case are, briefly, as follows. During the decade before the war a number of serious attempts were made to develop a commercial process for making peat fuel from the raw material, obviously so abundant. These attempts, while by no means barren of results, for one reason and another all fell short of commercial success, and a lot of money was lost. Meantime the federal Department of Mines had conducted a demonstration on a small scale, which was promising but inconclusive.

The general impulse to endeavour, born of war conditions, stimulated a further attempt to solve the peat problem, and since four years ago, public funds have been appropriated annually by the Ontario and Federal governments for the use of the Joint Peat Committee. This committee investigated first the fundamental conditions involved, and found that previous efforts, mainly concerned with the artificial drying and briquetting of peat, were fore-doomed to failure; it takes more calories of heat to effect this end than are contained in the resulting briquettes. This narrowed the field to air-dried peat, and the Committee have consistently and persistently worked at the development of mechanisms suitable for this purpose. They have now, after three seasons of experiment (the season is short—only 100 days,) succeeded in developing machines that give promise of producing an excellent fuel, saleable at a cost considerably less than that of imported coal.

The experiments of the last three years have, incidentally, resulted in the production of several thousand tons of peat, and its sale to those interested. Not all the peat made during the experiments has been of the first quality; that would be impossible from the very nature of experimental work. Nor was it practicable to segregate these poor lots of peat. As a consequence, a small amount of poor peat has been distributed with the good material, and there has been an occasional discord in the general song of approval from peat users.

The importance of the solution of the peat problem to all and sundry in Ontario and Quebec is well illustrated by a map of these two provinces showing the peat bogs that have been already examined. We have all had a vague idea that there is plenty of peat to be had; we have not all realized how well-distributed and accessible it is from our main centres of population and of fuel consumption. The huge bog at Alfred, 70 miles from Montreal and 40 miles from Ottawa, is capable of supplying the domestic hearths of these two cities almost indefinitely; and even their industrial requirements may be partly met by peat, as research and experiment extend its uses. Montreal, St Johns, Cornwall, Brockville, Ottawa, Kingston, St. Catherines, London and Kenora have their future fuel supply almost at their doors. The citizens of Toronto will have to pay freight on their peat for about a 40-mile haul. The North country is so well-blessed with peat-bogs, still unexplored by the official surveyors, that their future fuel supply is assured.

The News of Mining

The Commercial Intelligence Service, of the Department of Trade and Commerce, Ottawa, issue every Saturday the *Commercial Intelligence Journal*. Trade Commissioner Norman D. Johnston, whose headquarters are in Rotterdam, contributes to current numbers a very informing series of articles on the Scandinavian iron and steel trade, with special reference to the possibility of developing a market for Canadian products.

In a memorandum submitted to the Right Hon. Winston S. Churchill, M. P., by a deputation of the Royal Colonial Institute, it was pointed out that there is room in Canada for a 19,000,000 increase in population before this country would attain the density settlement that obtains in New Zealand. The expansion of the mining industry will account for much of the wished-for immigration.

On account of the severe depression in the Australian iron and steel industry, the Broken Hill Proprietary Company, which, with its plant at Newcastle N.S.W., is the largest producer, estimates that a reduction of 33 per cent in the price of coal, labor and supplies will be necessary before overseas competition can be met.

There are more than 130 blast furnaces in Sweden, most of them using charcoal as fuel, and 25 electric steel furnaces.

The American Smelting and Refining Company announces a marked increase in the output per man per day among its employees. The following figures represent a comparison of outputs seven years ago and at the present time:—

Plants	Operation	1911	Oct. 1921
Durango	Crushing	3.18	52.2
Murray	Unloading	9.2	25.3
Arkansas Valley	Roasting	6.4	13.6
El Paso	Bricking	2.0	4.1

The president, Mr. Simon Guggenheim, states that by means of various economies, their enterprises are on a sound basis, and that the Company will be able to take advantage in every way of the coming turn in the tide.

According to figures recently published by the Dominion Government, the developed water power in Canada now totals 2,756,000 h.p. There are roughly still about 50,000,000 h.p. available. As compared with the United States, Canada has installed 280 h.p. per 1000 of population, against 93 h.p. per 1000 of population in the former country. The vast untouched reserves of water power in British Columbia, Ontario and Quebec indicate that these three provinces have in store a wonderful future as centres of metallurgical industry.

Forty five United States potash producers have appealed to Congress for relief from German competition. They assert that German agents are conducting a campaign of misrepresentation to prevent the United States producers from securing moderate protection.

Present standard wages in the chemical and metallurgical industries of the United States range from 50c. to 75c. per hour; in England, 30c. to 45c. per hour; in Germany, about 10c. per hour at current exchange, or the equivalent of 20c. to 25c. terms of retail purchasing power.

Employment in the iron and steel industries of Canada shows a decided improvement. In copper industries there is a falling off, as there is, also, in coal mining in Alberta; whilst metal mining in general is holding its own.

The Premier Diamond Mining Company, Limited, South Africa, reports a revenue of only £439,636 from diamonds for the year 1921, as compared with £2,098,482 for the year 1920.

Because of the decreased cost of living and the need of reduced mining costs, the Rhodesia Mine Owners' Association has decided for a reduction in wages to take effect on April 1st. For the more highly paid employees, the reduction is to be 12.8 per cent. This is the maximum. The minimum is a 6 per cent. cut.

The London Daily Mail has issued a warning to investors in mining shares in Great Britain. The Mail referred especially to three Canadian flotations, sponsored respectively by Col. Grant Morden, F. C. Sutherland and Co. (Toronto,) and the Bingo Mining Company (Winnipeg). The two former flotations have to do with Porcupine, Ont., properties, the last with properties near Herb Lake, Northern Manitoba.

A newly organized company, the Dominion Alloy Steel Corporation, Limited, authorized capitalization $15,000,000, proposes to establish a plant at Sarnia, Ont. The reported annual capacity of the plant is 50,000 tons of alloy and high-carbon steels. Despatches state that Sir William MacKenzie is on the board of directors.

The United States Government has issued an official warning that no violence will be tolerated in the event of a coal miners' strike becoming an accomplished fact on April 1st.

The Hon. Mr. Stewart, Minister of Mines, Ottawa, last week submitted to Parliament a report upon the condition of his Department. Following is an extract therefrom:—

"The difference between Government salaries and those obtaining in commercial work and even in the universities at present is too great, and unless this is rectified there are bound to be frequent and recurrent changes of personnel resulting in a general lowering of standard in men employed and work done.

"This state of affairs should be avoided if possible, since the work of the department is such that only the most highly trained men should be employed, for anything short of the best is worse than none at all."

Within a few months the experimental work of the Joint Peat Committee will have been completed. All evidence up to the present points to the complete success of their experiments. Their success will add one more item to the long list of man's aids to his own civilization.

On March 23rd, the executive board of the United Mine Workers at Sydney, N. S., voted 4 to 3 to adopt J.B. MacLachlan's plan of instructing all Nova Scotian coal miners to cut coal production down to a point where there would be no possibility of profit for the operators. Already 18 men, employed by the Dominion Coal Company, have been discharged for loafing. The output to date to date has diminished somewhat, and the number of workers handling the coal from the face to the surface has been reduced in proportion.

In his paper read recently before the Institution of Mining and Metallurgy, London, Dr. J. MacIntosh Bell states that at the Keeley Mine, South Lorrain, Ont., the oxidized zone in the northern part of the vein goes down only a few feet, and immediately gives place to rich ore. On the southern working on the vein, the oxidized zone attains greater depth, passing through the contact and into the diabase.

A special feature in recent United States coke-oven practice is the exclusive use of silica bricks. The resistant character of silica brick is illustrated by the fact that one battery of evens has been shut down 15 times in five years, without requiring rebuilding or relining.

The Secretary of Mines for Great Britain has announced that certain types of breathing (rescue apparatus have passed official tests, and that the Board of Trade has approved them for use at mines and reserve stations. The approved types are:—

The Paul Mine Rescue Apparatus, made by the American Atmos Corporation, Pittsburgh, Pa.

The Mecco-Briggs Rescue Apparatus, made by the Mining Engineering Company, Sheffield, England.

Mining concessions in Spain are granted only to Spanish citizens, or to companies domiciled in Spain. In all such companies, directors and officials must be Spaniards.

The Ontario Department of Mines has issued its annual report on mining accidents in the Province during the year 1921. On that period there were 24 fatal accidents, of which 11 occured underground, one on the mine surface, 4 in metallurgical works, 5 in quarries, and 3 in sand and gravel pits. Of the mine fatalities, 8 were due to falls of rock. The non-fatal accidents numbered 1,262, including mines, quarries, etc. Accidents at underground ore-chutes were the most numerous in the classified list. The report shows a great diminution since the year 1908 in fatalities per thousand men employed.

A magnificent laboratory is being built at Minneapolis for the University of Minnesota and the U. S. Bureau of Mines. It is to be equipped for research work on iron and manganese ores.

OBITUARY.

William Thomlinson.

William Thomlinson, a well-known British Columbia mining man, died recently at his home, New Denver, Colorado. He came to British Columbia thirty years ago and became interested in mining. After completing a course in mineralogy at Queen's University, Kingston, Ontario, he was employed on several occasions by the Provincial Government in the collection of mineral specimens for exhibition purposes. In 1914 he was commissioned by the Dominion Government to assemble a representative collection of minerals of British Columbia for display at the Panama Pacific International Exposition, at San Francisco, California. He served as the British Columbia representative on the mineralogical staff of the Canadian Government Commission at that Exposition as well as the Panama International Exposition at San Diego, California. Later on he became identified with the Munition Resources Commission, in which connection he was especially interested in the platinum resources of the Province. Following the war he was commissioned by the Geological Survey to make a collection of the minerals of Southern British Columbia. An ardent worker in the interests of the mining industry of the Canadian West, and possessing a personality of force and charm, his death is very much regretted by all associated with mining in this Province.

Kent Archibald.

The sudden death of Kent Archibald at Truro, Nova Scotia, on March 21st, marks the passing of one of the very few successful operators of gold mines in the province. The late Mr. Archibald, along with Charles Mott, opened and sold the famous Dufferin mine. The Dufferin, after many vicissitudes, died a natural death. During the time that Mr. Archibald operated it, the mine paid handsomely. He also mined profitably in Hants and Guysboro Counties.

Mr. Archibald was of that admirable old type of Bluenose pioneer that never admitted defeat.

PERSONAL.

Dr. A. O. Hayes, late of the Geological Survey of Canada, and now field geologist with the Whitehall Petroleum Company, left Canada last week for California, where he will spend some months with his family at 505 W. Washington St., San Diego.

Mr. Alexander Gray last week paid a visit to Mr. J. L. Agnew, President of the Canadian International Nickel Corporation, in Copper Cliff.

The Toronto Branch of the Association of the Women of the Mining Industry of Canada held a meeting at the home of Mrs D. A. Dunlap on Tuesday March 28.

The Toronto Branch of the Canadian Institute of Mining and Metallurgy will hold a meeting on Saturday April 1st. Mr R. Home Smith will address the meeting.

Mr. E. P. Mathewson has returned from Burma via San Francisco.

Mr. F. W. Schumacher of Columbus, Ohio, president of Schumacher Gold Mines, is in Toronto for the annual meeting of his company.

M.J. M. Cohen is at Elbow Lake, Manitoba.

Mr. Geo. Hoehn of Waco, Texas and Mr. F. W. Hoehn of Pittsburgh have joined the board of directors of Schumacher Gold Mines.

News and Comments

By ALEXANDER GRAY.

The Basic Industries.

WHILE it is satisfactory to note the progress of precious metal mining in Canada, it would be a mistake to ignore the present unsatisfactory state of what is much more important — the coal and iron industries. There is now substantial evidence that these basic industries are, in the United States, on the up-grade. The United States Steel Corporation is now operating at 60 per cent. of normal capacity, which is about twice what it was last year. Agencies in Canada representing American steel producers report a satisfactory increase in the volume of orders.

In Nova Scotia, orders from abroad for iron ore brighten a prospect that is otherwise dull. The labour disputes prevent the resumption of coal mining on a large scale.

It cannot be said that Canadian steel fabricating plants have a cheerful outlook just at present; but the tide is on the turn, and when the banks feel at liberty to release funds, there will be enough business in construction work and in providing equipment to make our steel men smile once more.

The Prospector in the Alps.

A gold mine on top of the Alps where shipments may or may not have to be made by aeroplane, rawhiding being too laborious, is a cabled announcement. The intrepid prospector is undaunted by either space or diffienlty. Canadians of this species would rather stake in the snow and "mush it" anywhere. It is their intrepidity that provides silver linings for the clouds.

George Gray.

A word of commendation is due to Mr. George Gray, late Manager of the Associated Goldfields of Larder Lake, for declining to subordinate his personal and professional integrity, when proposed operations on the properties demanded the abandonment of both. If his report on those properties was in existence when the last annual meeting of Associated shareholders was held, why was it intimated that it would not be ready for about three months?

The Immature Banking View.

A glib Montreal branch bank manager the other day oracularly exclaimed: "Mining is not a sound business!"

What unsoundness prevails in real mining and development of mineral resources, it might in verity be urged, is somewhat attributable to such as he, who classify meretricious claims with actual returns expressed in bullion. However, it is dawning upon other bankers, and not a few business men, that the motive power provided by the Mining Industry is becoming formidable. A payroll of about $20,000,000 and the quantity of stores purchased entitle the Mineral Industries of Ontario to speak above a whisper. In wages and for stores the Transvaal mines annually expend approximately $150,000,000. A recent survey brought out the statement that 1,750 industrial establishements are centred on the Rand with its gold mines, Pretoria with its diamond mines, and Vereenigin with its coal mines and power. These subsidiary industries have a total capital of about $80,000,000. This represents a quarter of the registered capital employed in industrial undertakings for the entire South African Union. That is why those that disturb the industrial serenity of the mines out there are given short shrift. The business of mining is the mainstay of Africa south of the Zambesi. Without it the banks would not require so many branches. Branch managers, however admirable in daily intercourse, as a rule have no discretion other than what is prescribed by head offices. If more of them studied mining data, clients might get salutary advice rather than malediction for legitimate mining.

Ringing the Changes.

Oblique reasoning will have it that as a certain mining stock is at a premium of 150 per cent, above the gross value of the estimated ore reserves, then, another stock might as well duplicate the market performance. Both companies would then be capitalized in the market at $18,000,000 and $100,000,000, respectively, and there would be nothing but the absorptive power of the public to prevent endless others from volunteering for the over-the-top movement. The trouble with this is, however, that the pyramid would become inverted, and "great would be the fall thereof." Gravity has inflexible limitations. There must be a broad base for market movements of the sort on exhibit. Dizzy height induces vertigo. Manipulation will make a mine no more valuable than it really is and overplayed markets have but one result. So the safest course is to avoid markets with an undertow from which the best swimmers cannot escape. The definite factors of ore reserves, plus certain allowances for indicated ore, are all that should be considered by those that would avoid danger. Getting in at the steeple in order to reach the basement suits no one but sellers. So why indulge in sophistry about what this, that or the other stock ought to sell at, because some other stock has a blackboard valuation out of line with its ore reserves and prospects?

On to Quebec!

The staking of areas around Larder Lake, in Gauthier and surrounding townships in Ontario, is giving Quebec an overflow of snow birds that may be helpful. It is long since Opasatica and Obier and Reneault Lake sections were favorably considered. Ten years ago Dr. W. G. Miller noted that some of the Huronian rocks in Quebec corresponded with those of Porcupine. Harvie dealt with the geology and mineralogy, gold occurring both free and in combination with the silver telluride, petzite. Staking in winter, though, is not always worth while.

Putting it Over.

A cellulose Colonel, an Earl, a Sir Knight, and a staff officer of the "C. P. R." are sponsoring three mining issues in London. Under such patronage, the public naturally will place the responsibility where it belongs.

Further the deponent saith not! Canadians will keep their ears to the ground and await detonations.

Maintaining Our Status.

With the German mark quoted at 2.100 of a cent

it is to be truthfully maintained by unprejudiced Canadians that there is no lack of mining script worth infinitely more than the mark, although there is a considerable tonnage that will not stand the cost of cartage.

Hollinger Tonnage in Millerton Area

When the Hollinger mill is ready to dispose of six or seven thousand tons a day, it is taken for granted the average grade of the ore as given in the latest annual report will be diluted with some of the Millerton ore, of which nothing has been said since the former General Manager in discussing the basis of the merger wrote: "There is ample justification for assuming a high potential value" for the property. Never since then has reference been made to the Millerton mineralized section, which showed "an average value of $4.80 over a width of 126 feet," two portions of which showed "a value of $6.30 over a width of forty feet, and $6.50 over a width of 22 feet." It was intimated six years ago that "future development will show a comparatively large tonnage of ore averaging in the neighborhood of $6.50 per ton."

What further determinations have been made in this Millerton area is apt to be one of the surprises when Mr. Brigham has in operation his bench system of working the section. It may not be 126 feet wide all they way from the surface to the contact—and then, again, "It may continue through the contact." At any rate, 300' X 700' or so need not be a full 126 feet wide to great depth in order to provide a few million tons of useful ore. That is another reason why the Hollinger Company must have power a' plenty—and why they will have it, whatever the source. The province will see to it that this potential wealth is made real. Mining scientists are eager to have General Manager Brigham introduce the bench system of mining, with its low costs. Until the average cost of milling is established, the management discreetly has refrained from estimates as to how many million dollars now in low grade ore may be added to the fully proven reserves of higher grade.

Dome Reserves

One of the results of the recent visit of Directors is the semi-official statement that Dome mill heads are running $9.50 to the ton, and have been doing so for about two months. This is the highest average attained by the management in the history of the company, and it is expected to maintain it, if developments at the 1,100-ft. level prove the downward extension of the area of enrichment. While it may be that this grade of ore cannot be accepted as the average of the whole tonnage in reserve, the improvement is regarded as an endorsation of the policy of selective mining and will permit of the dilution of some of the higher with lower grade, thereby providing a satisfactory profit from a larger tonnage. No statement of Dome ore reserves of recent years has been incorporated in Dome reports, but if the conservative management feels at liberty to feed the current grade to the mill it is thought there is justification for so doing, for the time being. No doubt Mr. DePencier will safeguard his milling requirements sufficiently far ahead to exclude those errors of estimation which rather detracted from the otherwise efficient preceding management. Now that the Dome has been established upon a more substantial basis, it might be expedent to make more definite detailed pronouncements in the annual report. President Bache and General Manager DePencier in all probability will meet this suggestion when the report is published.

Hollinger Dividend Policy

Compared with others the market action of Hollinger shares is unsatisfactory to speculative holders and those that are not holders. They prefer livelier movements, and it is a frequent contention that Hollinger dividends are out of line with the market price, or vice versa. Whatever be the merits of the latter contention, there is no misunderstanding of the policy of the chief owners—the Directors. They have a great gold factory that has paid its original shareholders 353.7 per cent. on their speculative investment—there is another 171 per cent. in what is practically cash-on-hand and the proved ore reserves at the moment assure a further return of ot least 100 per cent. on the shares at parity, without considering the potentialities of the properties beyond present workings. Counting the cash assets, and assuming that one-half the gold in the reserves will be profit, there is more than $5.50 for every share issued. This leaves as the speculative factor the ore contents undetermined below the 550-ft levels and to depths unknown. So the Hollinger administration is not catering to those with a momentary interest, however willing it may be to reward the faithful and satisfy recent arrivals. As it has been with the great mines elsewhere, so it is with such as the Hollinger; those that continued steadfast from the beginning have several birds in the hand, and more in the bush.

Hollinger Makes Crushing Record

While it is definitely stated that the Dome Mines are contributing ore averaging $9.50 per ton, it is an open secret that Hollinger Mines are making the mill hit the high spots. In the week ended March 4th., Hollinger is said to have earned a profit of $138,000 or at the rate of $7,176,000 per annum. On one day a milling record of between 4,300 and 4,400 tons was achieved. That, if maintained, would mean a crushing of 1,400,000 or 1,500,000 tons in 1922. The management is making no such predictions, and the fact that a weekly profit of more than twice the dividend requirements was earned, is not being publicly purveyed. Since the beginning of this year, Hollinger Mines have travelled through a first quarter that lays the foundation for the world's milling record. Mr. Robbins, late General Manager, questioned the economy of this milling expansion; but the millions available are to be put in circulation, if the directorate can carry out their policy. Costs are nearer to normal and the greater tonnage being treated also increases the percentage of profits. General Manager Brigham has his economies well in hand. His mines have 46 miles of underground development; his mill is doing more per day than any other mill on earth; by shaft and diamond drill it has been demonstrated there is no change of formation or disconcerting feature that he knows of to a depth of 1,500 feet, and that is why he wears a who-should-worry smile. In his reckoning, it makes a decided difference when mines appeal to mills to take more ore. And yet Hollinger Directors continue in a bide-a-wee mood about increased dividends. In all of which, as majority shareholders, they hold they are conserving what will reward those who are patient.

British Columbia Letter

The Zinc Custom Plant at Trail.

Some weeks ago Mr. J. J. Warren, President of the Consolidated Mining & Smelting Company, was quoted as stating that arrangements had been made for the installation at Trail of a zinc Custom plant, and that with its completion the minerals of the Kootenay carrying this element would not be subject to penalty as heretofore. Wide publicity was given this declaration in the Province, is being rightly stated that the inauguration of such a policy would mean everything to the mine operators of eastern British Columbia. While Mr. Warren's offieial explanation is not yet available, it is understood that too broad a construction has been plaeed upon his words. It is true that a zinc custom plant is to be constructed, that zinc concentrate will find a market at Trail, and that the latest metallurgical methods will be applied to the treatment of the complex ores of the Kootenay. There is no doubt that this is an important advance, but it has not yet been indieated that the problem of economically handling these ores has yet been completely solved.

Another Dividend from Premier.

The Portland Canal Mining Distriet is beginning to stir, although the snow has not yet left and the open season must be considered some distance away. A new bridge is being thrown across Bear River by the Provincial Government. This will make the Marmot and Bitter Creek Section, where there will be much prospecting this summer, easy of access. The Premier Gold Mining Company has been at work all winter and with the opening of its new aerial tramway has begun making regular shipment. The country adjacent to this Company's property has been widely staked and substantial investments will be made in its prospecting and exploring.

It is interesting to note here that the Premier Company is reported to have prepared for the declaration of a dividend of $500,000 for the quarter ending March 31st, on its capitalization of 5,000,000 shares of a par value of $1.00 each. Following as this does the payment of a dividend of $400,000 for the quarter ending December 31st last, the Premier Mine appears to be realizing very rapidly the anticipations of the most sanguine.

The Independent Group of mineral claims, situated on the north side of Goose Creek, and at an elevation of 600 feet, is being extensively developed by the Fitzgerald Brothers. Supplies have been taken in over the snow on hand sleighs and work will continue all summer. They say that there are three large parallel mineralized zones on the property, which run east and west and are traceable on the surface for a considerable distance. Each has been stripped and tunneled to an extent with satisfactory results. On Bitter Creek the L. L. & H. Group is reported to be looking well. A large tonnage of ore has been proven. While it is not expected that it will develop into a high grade proposition, the ore is of a good grade for milling, its values showing gold and silver. J. Harkley, the owner, is proceeding with work in order to clearly demonstrate the possibilities of the property. This done, it is hoped that capital will be induced to take up the enterprise in a large way.

George Clothier, the resident mining engineer, has not yet got into the field, but will make inspections of a number of promising prospects as soon as the weather permits. He still advocates the opening up of the Unuk Country, situated just north of the Portland Canal Zone, by the construction of a trail, either altogether through Canadian territory or from the Coast first through American and then Canadian territory. It is his opinion that in this hitherto unexplored zone there are good prospects of important mineral discoveries.

Excitement at Cedar Creek.

Interest continues in the reported gold discoveries of the Cedar Creek section of the Cariboo. The excitement, for it already has reached that point, has been accentuated by the optimistic reports credited to several persons, who recently arrived on the Coast from this placer field. R. D. Featherstonhaugh, a mining engineer, declares that the Cedar Creek ground he examined is the best prospect he has ever seen. He stated that it was diffienlt for him to go over all the claims because of the depth of snow, but he had opened up the old workings and tested the values. He is quoted as saying that panning tests gave returns of from twenty to three hundred dollars per square yard, and that the gold is coarse, of glacial origin, and nuggets frequently found. A. Gilfillan, a claim owner, is equally enthusiastic. He makes the statement that after removing about four feet of snow from the surface and, by means of steel, loosening some of the frozen ground, he was able to obtain several ounces of coarse gold. Mr. Gilfillan thinks that Cedar Creek and the district immediately adjacent will be found to compare with some of the richest of the water ways of the Klondike.

Making all proper allowances for the natural optimism of those directly interested it would appear that good placer ground has been found at the point in question. It is noteworthy that the situation of this discovery is not far from the old Bullion workings, out of which the late Mr. J. B. Hobson took a considerable quantity of gold. The location is in direct line with the so-called "gold run", the sweep of which is from the Alaskan Coast in a south-eastern direction through the Yukon, the Omineca and the Cariboo. The only strange feature is that such ground should have been overlooked by the miners of 1862 in their operations in that district. The old-timers, as records show, were very thorough in their exploration and usually worked out their claims completely. They were operating all round the Cedar Creek district, some of the most productive properties of that time being situated not far away. However, more unusual things have happened than the oversight that this seems to indicate.

There is no doubt that there will be stampede to the discoveries as soon as the snow leaves. Inquiries for information are being received by the Mines Department from many sources. Most of the prospectors will enter the country by means of the Pacific Great Eastern Railway, leaving the train at Williams Lake and thence by stage to their destination. The accessibility of the ground no doubt will induce many to make the trip through curiosity rather than with any serious intention of actively engaging in mining.

Drumlummon Mine.

The Drumlummon Mine, situated at Hartley Bay,

northern British Columbia, is likely to be extensively developed, it having been announced that New York funds to the extent of $275,000 have been secured for that purpose. The building of a new camp, a dock, railroad and the installation of a new compressor plant are some of the improvements contemplated. There are three large veins on this property, and it is the intention to open them up at depth. Some very high grade copper gold ore has been taken from the vein to which development thus far has been confined.

Maroon Mountain.

The Kitsumgallum Lake district northern British Columbia will see some mining development this summer. There are a number of properties situated on Maroon Mountain, among which are groups known is the "Bear" and the "Black Wolf". A Ross mill was taken in last year to handle the ore of these claims, but it was too late in the season to start operations. A test run, however, will be made as soon as conditions permit and it is the intention of the owners, if the results warrant it, to bring in two more mills, either of the Ross or of another type.

Ore Receipts at Trail.

Ore receipts at the Trail smelter, Consolidated Mining & Smelting Company, from March 8th to 14th inclusive totalled 9153 tons, making the aggregate for the year up-to-date 89,212 tons. Of the week's returns the Mountain Chief, North Denver contributed 9 tons; the Paradise, Windermere, 36 tons; the Rosebury Surprise, 143 tons; and the Silversmith, Sandon, 666 tons; and the remainder came from the Company's mines.

Tyee Company to be Wound Up.

Advices from London, England are to the effect that the Tyee Lumber Company, Ltd. is to be wound up. This company was organized in 1900 to develop the Tyee Mine on Mount Sicker, Vancouver Island. The mine was equipped with an aerial tramway, three and a half miles long, connecting with the E. & N. Railway, and a smelter was built at Ladysmith. The Property was purchased for $400,000,, this being made up of fully paid-up shares. The mine was operated from 1902 to 1907, when the ore was exhausted. During the time it operated the Company paid dividends of from 5 p.c. to 20 p.c. per annum, and accumulated a reserve of $400,000. The ore body was 2,500 feet long and varied in width from 5 to 50 feet with a depth of 50 feet. The values averaged $3.00 in gold, 25 ounces of silver per ton and 4 p.c. copper. The shaft was 1,000 feet deep, but it encountered no ore below the 300 foot level. Considerable diamond drilling was done on the exhaustion of the ore body, but without success. Since then an effort has been made to keep the Ladysmith smelter in operation on custom ores, but this has not worked out satisfactorily. It is suggested as a possibility that the plant might be taken over by the Consolidated Mining & Smelting Company. This Corporation has a number of properties on Vancouver Island under development, notably the "Old Sport," "Quatsino" and the "Sunloch", Jordan River. With a continuous supply of ore assured from these properties,perhaps supplemented by the contributions of other Coast producers there is every reason to believe that the smelter could be kept in operation continuously.

Vancouver Island Prospectors Association.

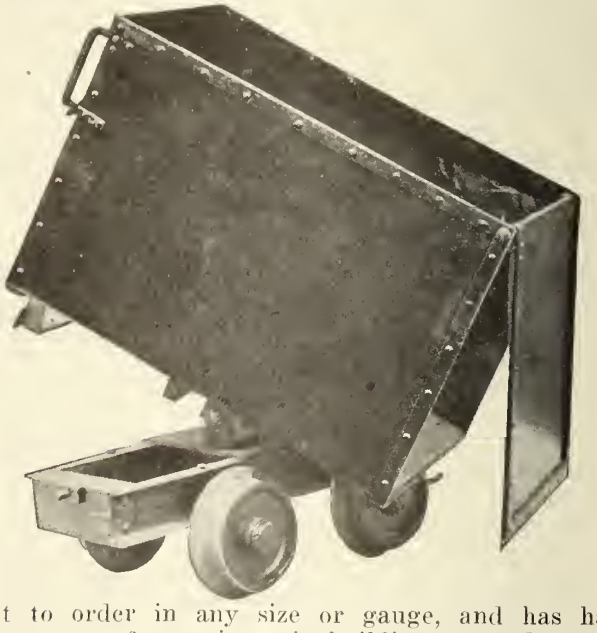
Much interest has been taken this winter in the Lectures delivered by Government mining engineers to mining men. They have been largely attended on the Coast and reports from the interior indicate similar appreciation. One of the results has been the organization of a Vancouver Island Prospectors Association, Thomas Golby being appointed chairman and G. E. Winkler secretary. It is proposed to call prospectors and others interested in mining together frequently for the purpose of discussing matters of common interest.

Shipping Ore from Mayo

Reports from Dawson, Yukon Territory are to the effect that when navigation opens on the Yukon rivers there will be shipments of ore, mined in the Mayo district, of record size. The Yukon Gold Company alone will have 31,000 tons of silver ore ready to be carried to the smelter.

CANADIAN MADE MINE CARS

The illustration, showing a side and end Mining Dump Car on a turn-table base, is one of the several designs of this type of car manufactured by the Phillip Gies Foundry of Kitchener, Ont. This firm, which has been established for upwards of twenty years, specializes in the manufacture of mine cars



built to order in any size or gauge, and has had many years of experience in building cars adaptable to Canadian conditions.

The car shown is 18 inches gauge, with a capacity of 20 cubic feet. With the equipment and facilities this company control at Kitchener they are in a position to turn out these cars in any quantity that may be required by our Canadian mines.

In addition to this line they also manufacture the "Superior" Shaking and Dumping Grate, as well as a line of vises and other equipment useful to the Mining Industry.

The Standard Steel Construction Co. Limited of Welland, Ontario, have received the contract for the structural steel work of the new mill building being put up at Schumacher by the McIntyre-Porcupine Mines Co., Ltd. The work on this building will be proceeded with at once and will make quite an addition to the already extensive plant at this Company's mines.

It is reported that gold has been discovered near Bontddu, Merionethshire, Wales, whilst men were preparing to plant trees. It will be interesting to see whether the "Axe" of economy will now fall less heavily on the Department concerned with afforestation.

The Canadian Miners' Buying Directory.

Acetylene Gas:
Canada Carbide Company, Ltd.
Prest-O-Lite Co. of Canada, Ltd.

Acetylene Welding:
The Toronto Iron Works, Ltd.

A.C. Units:
Powley & Townsley, Limited.

Agitators:
The Dorr Co.
Can. Chicago Bridge & Iron Co., Ltd.
Horton Steel Works, Limited.

Air Compressors:
Bellias & Morcom, Ltd.
Laurie & Lamb
Sullivan Machinery.

Air Hoists:
Canadian Ingersoll-Rand Co., Ltd
Mussens, Limited.

Air Receivers:
The Toronto Iron Works, Ltd.

Alloy and Carbon Tool Steel:
Peacock Brothers Limited.

Alternators:
MacGovern & Co.

Aluminium:
Spielman Agencies, Regd.

Amalgamators:
Northern Canada Supply Co.
Mine and Smelter Supply Co
Wabi Iron Works.

Antimony:
Canada Metal Co.

Antimonial Lead:
Pennsylvania Smelting Co

Assayers' and Chemists' Supplies:
Dominion Engineering & Inspection Co
Lymans, Limited
Mine & Smelter Supply Co.
Pennsylvania Smelting Co.
Stanley, W. F. & Co., Ltd.

Ash Conveyors:
Canadian Link-Belt Company

Ashes Handling Machinery:
Canadian Link-Belt Co., Ltd

Assayers and Chemists:
Milton L. Hersey Co., Ltd
Campbell & Deyell
Ledoux & Co.
Thos. Heys & Son
C. L. Constant Co.

Asbestos:
Everitt & Co.

Balls:
Hull Iron & Steel Foundries, Ltd
Peacock Brothers Limited.
The Wabi Iron Works.
The Hardinge Conical Mill Co.
The William Kennedy & Sons, Ltd.

Ball Mills:
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd
Mine & Smelter Supply.
The Wabi Iron Works.

Babbit Metals:
Canada Metal Co.
Hoyt Metal Co.

Ball Mill Feeders:
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd
Mine & Smelter Supply.

Ball Mill Linings:
Hardinge Conical Mill Co.
The William Kennedy & Sons, Ltd.
Peacock Brothers, Limited
Hull Iron & Steel Foundries, Ltd
Mine & Smelter Supply.

Balances — Assay & Analytical:
Mine & Smelter Supply.
The William Kennedy & Sons, Ltd

Belting—Leather, Rubber and Cotton:
Canadian Link-Belt Co., Ltd
Northern Canada Supply Co
Jones & Glasco.

Belting:
R. T. Gilman & Co
Gutta Percha & Rubber, Ltd

Belting—Silent Chain:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal
Jones & Glassco (Itegd.)

Belting (Transmission):
Goodyear Tire & Rubber Co

Belting (Elevator):
Goodyear Tire & Rubber Co

Belting (Conveyor):
Goodyear Tire & Rubber Co
Gutta Percha & Rubber, Ltd

Bins and Hoppers:
The Toronto Iron Works, Ltd.
Can. Chicago Bridge & Iron Co., Ltd.
Horton Steel Works, Limited.

Blasting Batteries and Supplies:
Canadian Ingersoll-Rand Co., Ltd
Mussens, Ltd.
Canadian Explosives, Ltd.
Powley & Townsley, Limited.

Bluestone:
The Consolidated Mining & Smelting Co
The Coniagas Reduction Co., Ltd.

Blowers:
Canadian Fairbanks-Morse Co., Ltd
Northern Canada Supply Co.

Boilers:
Canadian Ingersoll-Rand Co., Ltd
Marsh Engineering Works
R. T. Gilman & Co.
The John Inglis Company
Wabi Iron Works.
The William Kennedy & Sons, Ltd.

Blue Vitriol (Coniagas Red):
Canadian Fairbanks-Morse Co., Ltd

Borts and Carbons:
Diamond Drill Carbon Co.

Boxes, Cable Junction:
Standard Underground Cable Co. of Canada, Ltd.
Northern Electric Co., Ltd.

Brazilian Rough Diamonds:
Diamond Drill Carbon Co.

Brazilian Mica:
Diamond Drill Carbon Co.

Buggies, Mine Car (Steel)
Hendrick Manufacturing Co

Brazilian Ballas:
Diamond Drill Carbon Co.

Brazilian Rock Crystal:
Diamond Drill Carbon Co.

Brazilian Tourmalines:
Diamond Drill Carbon Co.

Brazilian Aquamarines:
Diamond Drill Carbon Co.

Bridges—Man Trolley and Rope Operated—Material Handling:
Canadian Mead-Morrison Co., Limited

Bronze, Manganese, Perforated and Plain:
Hendrick Manufacturing Co.

Buckets:
Canadian Ingersoll-Rand Co., Ltd
R. T. Gilman & Co.
Hendrick Manufacturing Co.
Canadian Link-Belt Co., Ltd
Marsh Engineering Works
Mussens, Ltd.
MacKinnon Steel Co., Ltd.
Northern Canada Supply Co.
The Wabi Iron Works
The William Kennedy & Sons, Ltd.

Buckets, Elevator:
Canadian Link-Belt Co., Ltd.
Hendrick Mfg. Co.
Peacock Brothers Limited.
The William Kennedy & Sons, Ltd.

Cable—Aerial and Underground:
Canada Wire & Cable Co.
Northern Canada Supply Co
Standard Underground Cable Co. of Canada, Ltd
Peacock Brothers, Limited

Cableways:
Canadian Mead-Morrison Co., Limited
Fraser & Chalmers of Canada, Ltd.
Mussens, Ltd.
The Wabi Iron Works
R. T. Gilman & Co.

Cages:
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que
Northern Canada Supply Co.
Fraser & Chalmers of Canada, Ltd
The Mine & Smelter Supply Co
Mussens, Ltd.
The Wabi Iron Works
The William Kennedy & Sons, Ltd.

Northern Ontario Letter

THE GOLD MINES.

A steady stream of gold bars, pouring out from the big producing gold mines in the districts of Porcupine and Kirkland Lake, is drawing widespread attention to the mining fields of Northern Ontario. Everywhere, there seem to be signs of prospecting activity on a scale heretofore unequalled in these districts. In some instances, the attention of speculators is found turning to the stock market where quick fortunes are being made through the spectacular rise of prices on the open market. Interest of a more lasting variety, however, has turned to new properties where exploration work holds out promise of new and profitable mines being developed.

Porcupine Peninsula.

As a result of the exploration work going on, some good results have been encountered in that part of the Porcupine mining division lying on the north-east shore of Night Hawk Lake. Lateral work has been under way on the Porcupine Peninsula property, under the management of A. R. Globe, a former superintendent of the Hollinger Consolidated Gold Mines. The vein has a width of between 18 and 20 feet and is being opened up by a drift at the 200-feet level. Cross-cuts are being run at intervals of every 50 feet along the vein. Visible gold is present in the quartz and the assays are reported to be promising.

A. Lewisohn in Goldale.

According to official advice both from the Goldale Mines, Ltd., and the Kerr Lake Mining Company, it is learned that Messrs Adolph Lewisohn & Sons of New York have entered into a contract to purchase a considerable block of stock in the Goldale property at Porcupine.

The Lewisohns made an outstanding success of the Kerr Lake mine at Cobalt and are rated among the first-class mine operators of this continent. Their entry into Porcupine is therefore regarded as being extremely important.

A feature of the deal is that it involves fifty mining claims made up of fifteen groups, and that a considerable part of the property lies at the north-east end of Pearl Lake in direct line with the strike of the big deposits of the Hollinger and McIntyre mines. Also, a considerable acreage lies adjacent to the Dome Mines on the north-east.

It is understood that the work will be done by the staff of the Kerr Lake Mines, with Harry Kee in charge of operations.

South Keora.

The promoters of the South Keora property have succeeded in raising about $40,000 and are endeavoring to increase this amount preparatory to resuming operations by early summer.

Dome.

According to late information, the output from the Dome Mines for the first quarter of the current year will exceed $900,000, and, with the premium on United States funds, may realize a gross income of not far under $1,000,000 for the three months. This achievement is far ahead of anything formerly recorded on the Dome.

Increased Efficiency.

Much higher working efficiency is being established at the gold mines and the cost of producing the metal in Porcupine promises to undergo a subtantial decline this year. It is noted particularly at the McIntyre that a substantially reduced force of men are doing more work than did the larger force not long ago. This is pointed to as being extremely important from the point of view of the stockholders.

V. N. T. to Reopen.

It is now practically assured that the Porcupine V. N. T. will be in full operation some time during April. The controlling interests of this mine are also in control of the Keeley Silver Mines where outstanding success is being achieved, which fact is said to assure funds for carrying out an extensive plan of operation on the Porcupine V. N. T. No attempt will be made to operate the mill before several months of development work.

Kirkland Lake.

The Journal representative made a general tour this week through the central part of the Kirkland Lake district and is in a position to record some interesting facts. One of these is that the Kirkland Lake Mining Company, which is controlled by the Beaver Consolidated, has encountered a change, or, rather, repetition of the geological condition at the lower levels as compared with that found at the upper levels. The porphyry intrusion in the upper workings appears to have petered out, but work at the 7th and 9th levels seems to be on the apex of an ore shoot distinct from that worked closer to the surface. The ore at a depth of 900 feet is high grade and the work of connecting the central shaft to this level will be completed within the next week or so. The opening up of the 8th level will be undertaken, while arrangements will be made to carry the main shaft down to a depth of 1,150 feet, thus providing working levels at 900, 1025 and 1150 feet deep. The probability is that this zone of enrichment may be the continuation of what was recently developed at the 600 feet level of the Teck-Hughes, which comes close to surface on the Lake Shore.

Teck-Hughes.

During February the Teck-Hughes handled an average of 149 tons of ore daily, the mill having reached as high as between 170 and 180 tons per day on certain dates. Meanwhile, the work of continuing the winze from the 600 feet level to a depth of 980 feet is proceeding at a good rate. Some early delays occurred, but the winze is now down about 700 feet and is proceeding at the rate of approximately five feet per day. After this work of sinking is completed, attention will then be turned to the development of levels at depths of 605, 730, 805 and 980 feet. The work recently done at the 605 ft. level will be remembered as having opened up a considerable quantity of high-grade ore.

Wright-Hargreaves.

At the Wright-Hargreaves, the mill during February handled an average of upwards of 200 tons of ore daily. This was a new high record and is in excess of the capacity for which the mill was originally designed. Gold bars are poured twice monthly, each clean-up being made up of two or three bars of an aggregate value of $30,000 to $40,000, or at the rate

Canadian Miners' Buying Directory.—(Continued)

Cables—Wire:
Standard Underground Cable Co of Canada Ltd
Canada Wire & Cable Co.
R. T. Gilman & Co.

Cable Railway Systems:
Canada Wire & Cable Co.

Cam Shafts:
Hull Iron & Steel Foundries, Ltd
Peacock Brothers Limited
The William Kennedy & Sons, Ltd.

Car Dumps:
Sullivan Machinery Co.
R. T Gilman & Co.

Carbide of Calcium:
Canada Carbide Company, Ltd.

Cars:
John J. Gartshore
MacKinnon Steel Co., Ltd.
Northern Canada Supply Co.
Marsh Engineering Works
Peacock Brothers, Limited
Mussens, Limited
Powley & Townsley, Limited.
R. T. Gilman & Co
The William Kennedy & Sons, Ltd.

Car Wheels and Axles:
Canadian Car Foundry Co., Ltd.
Burnett & Crampton
Hull Iron & Steel Foundries, Ltd
John J. Gartshore
Marsh Engineering Works, Ltd
Peacock Brothers Limited
The William Kennedy & Sons, Ltd.

Carriers (Gravity):
Jones & Glassco

Castings—Brass
The Canada Metal Co., Ltd

Castings (Iron and Steel)
Hull Iron & Steel Foundries, Ltd
Peacock Brothers Limited.
The William Kennedy & Sons, Ltd.

Cement Machinery:
Hadfields, Limited
Hull Iron & Steel Foundries, Ltd.
Burnett & Crampton
The William Kennedy & Sons, Ltd.

Chains:
Jones & Glassco
Northern Canada Supply Co.
Canadian Fairbanks-Morse Co., Ltd
Canadian Link-Belt Co., Ltd.
Greening, B., Wire Co., Ltd.

Chain Drives:
Jones & Glassco (Regd.)

Chain Drives—Silent and Steel Roller:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal (
Jones & Glassco) Regd.).

Chemical Apparatus:
Powley & Townsley, Limited.

Chemists:
Canadian Laboratories
Campbell & Deyell
Thos. Heyes & Sons
Milton Hersey Co.
Ledoux & Co.
Constant, C. L. Company

Chrome Ore:
The Electric Steel & Metals Co.
Everett & Co.

Classifiers:
Mussens, Limited
Fraser & Chalmers of Canada, Ltd
The Wabi Iron Works
R. T. Gilman & Co.
The Dorr Company

Clutches:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal, (

Coal:
Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutters:
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd
Peacock Brothers, Limited

Coal Crushers:
Canadian Mead-Morrison Co., Limited
Canadian Link-Belt Co., Ltd.
Peacock Brothers Limited

Coal Mining Explosives:
Canadian Explosives, Ltd
Giant Powder Company of Canada, Ltd

Coal Mining Machinery:
Canadian Rock Drill Co
Denver Rock Drill Mfg Co., Ltd
Canadian Ingersoll-Rand Co., Ltd
Sullivan Machinery Co.
Marsh Engineering Works
Hadfields, Ltd.
Hendrick Mfg. Co.
Powley & Townsley, Limited.
Mussens, Limited

Coal and Coke Handling Machinery
Canadian Link-Belt Co., Ltd.
Powley & Townsley, Limited.

Coal Pick Machines:
Sullivan Machinery Co.

Coal Screening Plants:
Canadian Link-Belt Co., Ltd

Cobalt Oxide:
Coniagas Reduction Co
Everitt & Co.

Compressors—Air:
Smart-Turner Machine Co.
Canadian Ingersoll-Rand Co., Ltd
Mussens, Limited
Peacock Brothers, Limited

Concrete Mixers:
Gould, Shapley & Muir Co., Ltd.
MacGovern & Co., Inc
Mussens, Limited

Condensers:
Smart-Turner Machine Co.
Northern Canada Supply Co
Bellliss & Morcom, Ltd.
Laurie & Lamb
Peacock Brothers, Limited

Concentrating Tables:
The Mine & Smelter Supply Co
Deister Concentrator Co

Converters:
Northern Canada Supply Co.
MacGovern & Co., Inc.

Conveyors—McCaslin Gravity Bucket:
Canadian Mead-Morrison Co., Limited

Contractors' Supplies:
Canadian Fairbanks-Morse Co., Ltd.

Consulting and Engineers:
Hersey Milton Co., Ltd.

Conveyors:
Canadian Link-Belt Co., Ltd.
Jones & Glassco (Regd.)
Powley & Townsley, Limited.

Conveyor Belts:
Gutta Percha & Rubber, Ltd.

Conveyor Flights:
Canadian Link-Belt Co., Ltd
Hendrick Mfg. Co., Ltd.

Conveyor—Trough—Belt:
Canadian Link-Belt Co., Ltd.
Hendrick Mfg. Co.
Mussens, Limited
Jones & Glassco (Roller, Belt and Chain)
Hendrick Mfg. Co.

Conical Mills:
Hardinge Conical Mill Co.

Copper:
The Canada Metal Co. Ltd.
Consolidated Mining & Smelting Co.

Couplings:
Hans Renold of Canada, Limited, Montreal

Cranes:
Canadian Mead-Morrison Co., Limited
Canadian Link-Belt Company
Peacock Brothers, Limited
R. T. Gilman & Co.
Smart-Turner Machine Co

Crane Ropes:
Allan Whyte & Co.
Canada Wire & Cable Co
Greening, B., Wire Co., Ltd
Peacock Brothers, Limited

Crucibles:
The Mine & Smelter Supply Co.

Crusher Balls:
Canada Foundries & Forgings, Ltd.
Hull Iron & Steel Foundries, Limited Hull Que
Osborn, Sam'l (Canada) Limited
Peacock Brothers, Limited
Swedish Steel & Importing Co., Ltd
The William Kennedy & Sons, Ltd

Crushers:
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
Hardinge Conical Mill Co
Lymans, Ltd.
Mussens Limited
Osborn, Sam'l (Canada) Limited
The Electric Steel & Metals Co., Ltd.
R. T Gilman & Co.

of not far under $70,000 monthly. The work of sinking toward the 1000 feet level of the mine is proceeding. Production is coming from the 200 and 400 feet levels, while the shaft has been carried to 550 feet, where a station has been cut.

Tough-Oakes.

Within the next two or three weeks the mill on the Tough-Oakes mine will be in shape for operation. All is now in readiness to place the cable and buckets on the aerial tramway, while the crushing station at the central shaft (formerly the Burnside No. 3) is also nearing completion. The new ore at the 400 feet level has been made accessible from the central shaft by a cross-cut, while another cross-cut is being driven north to the No. 11 vein. The main shaft, three-compartment, will be at the 550 feet level by the end of March, at which point another cross-cut will be driven to open up the downward continuation of the new ore body.

Lake Shore.

During the month of February, according to the regular monthly statement of R. C. Coffey, manager, the Lake Shore mill reduced 1,961 tons of ore and produced $44,082.20. The mill ran 97-17 per cent. of the possible running time and treated an average of 70 tons of ore daily. The grade of the ore continued high, at $22.48 from each ton treated.

THE SILVER MINES.

McKinley-Darragh.

The expectations of a general revival this spring in the Cobalt district has not been justified as yet. The announcement that the McKinley-Darragh would not be re-opened this spring came as a disappointment to the community in its vicinity.

Nipissing.

On April 20th, the Nipissing Mining Company will disburse a regular quarterly dividend of 3 p.c., to stockholders of record March 31st. The financial statement shows liquid assets of $4,287,933.55. The physical condition of the mine continues to be favorable and the production is being well maintained.

Sanderson.

A deal is being arranged where by the Sanderson property in the Gowganda district may be operated. A Montreal syndicate is interested and the necessary arrangements are being made to finance work.

Elk Lake prospectors have re-staked a large number of claims that were numbered among the recent forfeitures. Among these were such proprties as the Tee Arr, Crown Jewel, McKenzie, McCrea and so on.

La Rose.

Information just obtained would tend to indicate that the voting at the forthcoming meeting of the La Rose Mines will result in a return of the present management by a large majority.

It would appear as though the shareholders' committee that seems to make its headquarters in a Toronto brokerage office, is meeting with widespread opposition, and that the uneasiness created by the sudden attempt to discredit the management is rapidly being allayed in the light of the real facts of the situation.

There seems to be no doubt entertained but that the directorate headed by Lorne McGibbon will be returned and that the management of the mill will continue under G. C. Bateman.

JUDICIAL SALE OF MINING PROPERTIES, PLANT AND EQUIPMENT.

IN THE SUPREME COURT OF ONTARIO.

IN THE MATTER OF PREMIER LANGMUIR MINES, LIMITED; AND IN THE MATTER OF THE WINDING-UP ACT AND THE AMENDMENTS THERETO.

Pursuant to the order for sale made herein, dated the 28th day of February 1922, there will be sold by public auction by the Liquidator, with the approbation of H. S. Blackburn, Esquire, Local Master of this Court at London, at his Chambers at the County Buildings, Dundas and Ridout Streets, London, Ontario, on Monday the 1st day of May 1922, at the hour of 3 o'clock in the afternoon, the following lands, buildings, mining plant and equipment, namely: those certain parcels of land situate in the Township of Langmuir in the District of Temiskaming (Ontario) and numbered 39, 40, 41, 42, 43, 44, and 4373 in the Register for the District of Temiskaming, containing two hundred and fifty-five acres more or less and being the mining properties formerly owned and operated by Premier Langmuir Mines Limited as a barytes property; together with the buildings, mining plant and equipment now on the said mining properties and heretofore used in connection therewith.

On the said lands are situate the following buildings: Mill Building, Engine House and Boiler House, Blacksmith's Shop, Superintendent's Office, Shaft House — all of which are protected by asbestos sheeting — Office, Storage Building, Bunk Houses with beds and bedding, Dining Camp with ordinary equipment and a stable. The Mill Building is equipped with the following machinery: Crusher, Dryer, Jiggs, Pulverizer and necessary shafting and pulleys. The Engine House is equipped with a Goldie-McCulloch Engine, 150 h.p. and the Boiler House contains a boiler of 125 h.p., a hoist and other equipment. There is an electric light and power plant, a tramway from the mine to the water, two horses and harness.

There are on the property about 125 feet of shaft work and about 250 feet of tunnelling and drifting.

The Liquidator has a letter from the Provincial Geologist, Ontario Department of Mines, stating that "the veins are strong and well defined and there is a large quantity of barytes in the deposits". There are showings of native silver and argentite in some of the veins. Photographs and descriptions are contained in some of the Government mining reports.

The lands are situate in the Township of Langmuir in the Porcupine Mining Division and are on the Night Hawk River about 30 miles from Connaught Station on the T. & N. O. Ry. and about 30 miles south east of Porcupine.

The property will be sold in one parcel.

Ten per cent. of the purchase money is to be paid down on the day of sale and the balance, over and above the amount which may be found to be secured by a mortgage on the said lands to secure a bond issue (which mortgage the purchaser is to assume), to be paid within thirty days after the sale or as soon thereafter as the amount of the mortgage is ascertained.

In the event of the amount of the mortgage not being ascertained within thirty days after the sale the purchaser shall, if required, pay such additional sum on account of the purchase money as may be fixed by the said local Master, having regard to the probable amount which may be found to be secured by the said mortgage, and upon such payment the purchaser shall be entitled to possession. Any balance remaining unpaid after the amount of the said mortgage is ascertained shall be paid forthwith thereafter.

The purchaser is to search the title at his own expense and fifteen days from the day of sale shall be allowed for that purpose and if any objection to or requisition on title is made within that time which the vendor is unable or unwilling to answer or remove the contract shall cease and the deposit money will be returned to the purchaser without interest. The vendor is not to be bound to furnish or produce any abstract of title or any proof or evidence of title other than those in his own possession.

In all other respects the terms and conditions of sale will be the standing conditions of The Supreme Court of Ontario.

Further particulars can be had from F. W. Raymond, Esquire, Liquidator of Premier Langmuir Mines, Limited, London, Ontario, and from Ivey, Elliott & Ivey, Esquires, London, Ontario, Solicitors, for the Liquidator.

Dated at London this 13th day of March, 1922.

H. S. BLACKBURN, Local Master, Middlesex.

EDITORIAL

T. A. RICKARD

OUR old friend and new conjoint contemporary Engineering and Mining Journal-Press, made its first appearance on April 1st. We observe with approval that the front outside cover is adorned with a characteristic portrait of Mr. T. A. Rickard, who, since the merger, has become contributing editor to the consolidated publication.

That Mr. Rickard's services have been retained is a matter of most sincere congratulation. His absence from the field of technical literature — particularly from the quarter-section of polemics — would leave a distressing gap. Mr. Rickard's writing has been variously characterized. We have heard it described as "mordaunt", "vitriolic," "incisive," "polished," "splenetic," "clarent," "lucid," "forceful", and in numerous other ways. To some of these adjectives, Mr. Rickard himself would take strong exception, quite apart from any question of their applicability. To us they seem either inadequate or inept. As a matter of fact, Mr. Rickard is first a trained, honest, and capable observer, a fearless recorder of his observations, and a careful user of the English language. Add to these qualifications the divine spark, a touch of knight errantry and the habit of writing only when he has something to write about, and you get a fair mental picture of the *doyen* of English technical writers.

We wonder if Mr. Rickard will resent the epithet!

DISPUTE AND STRIKE.

THE introduction of the policy of "striking on the job" in Nova Scotian collieries is in essence a criminal act. The moral responsibility for this overt misdeed rests primarily with Organizer McLachlan. In lesser degree the miners themselves must bear the onus. By no perversion of logic can the stand thus taken be condoned. The policy is short-sighted, stupid and unequivocally dishonest. That any of the miners have been led into it is deeply to be regretted.

Miners are citizens, normally the very best of citizens. All large aggregations of men following the same industrial calling may, under stress, become foolishly responsive to the demagogue. In doing so, they lose sight of their inescapable duty as citizens, of their obligation to the community and to the nation, to the association of fellow-beings that makes existence possible for them and their families.

If the Western miners' demands are as represented in the daily press, then it is out of the question for the operators to accede to them. If the operators are guilty of a breach of faith, then it is incumbent on the Governments of the United States and Canada to see that faith is kept.

But there are far too many "ifs" involved. What the consumers must have is a judicial presentation of both sides. Meantime both sides will lose face if wrong methods are tried. The public is judge and jury.

EDUCATING THE PUBLIC.

AT a meeting last week of the Associated Boards of Trade of Northern Ontario, a resolution was passed asking the Provincial Government to give more publicity to Ontario's mineral resources. Resolutions were also passed asking for better transportation facilities, and the enlargement of the activities of the geological department.

The communities of Northern Ontario exist mainly by reason of the mining industry, and realize the fact. Throughout the older parts of the province, the facts of the mining industry are known only vaguely, if at all. The present effort of the newer community to educate the older is commendable, and worthy of being continued.

The advertising at present enjoyed by the mining industry is not altogether of a savory sort. Our newspapers publish the current prices of shares, sensational movements in shares, and news items, mainly calculated to influence the market. Occasionally items of more substantial interest creep into the columns, but this is more by accident than by design. One result of this condition is that some of the more reputable of our newspapes refuse to publish any mining news or notes unless these have undergone a severe censorship — and few items survive. But the main result is, and a deplorable result it is, that the public has been educated to the belief that mining consist mainly of trading in shares, and that mining is a business of dubious character, highly speculative, and radically different from any of the more substantial and better known phases of our national activity.

Nor does the trading in shares itself give any substantial return to the mining industry. It is true that, when a spectacular "boom" in gold shares is in progress, the public learns more about our gold mines. But truth is so inextricably mixed with falsehood that it is difficult, if not impossible, for any but the initiate to separate the wheat from the chaff. The results, on the whole, of trading in mining stocks are probably such that no trading at all would be better for the industry. The real issues are usually obscured

in the trading, and it gives justification to the idea, almost universally held at present by the public, that mining shares exist primarily as a means for stock gambling.

What our mining industry needs, and needs badly just now, is disinterested publicity of a general sort, such as will help the public to consider mining as an industry, and of our undeveloped mineral resources as sound and safe bases for the establishment of new enterprises. Unfortunately, the men that labour hard and long to make mines are not organized as are those whose business it is to trade in shares. Consequently the united voices of those calling from the stock markets on behalf of the mining industry almost drown the calls for aid from the operators of mines and prospects. The public pays attention to the loudest shouting, rather than to the relative merits of the causes advocated. It reminds one of the nomination of a President in the United States!

Every means must be adopted whereby the average citizen may become more fully cognizant of the facts of the mining industry. Only by this means will mining get its full share of public support, and take the place in our national economy that it must and will occupy. We must tell the public the true story of the prospector, working year in and year out, despite discouragement that would deter all but a genuine enthusiast, and the reward often all too meagre, that attends his effort. We must let it be known how the engineer takes over the find from the prospector, and develops it to the point where Nature's store is available for human use. We must warn the public of the tendency their funds have to shrink, and even evaporate completely, on the devious way from their pockets to the new mines and mills. In short, we must lose no opportunity of introducing to the public the man who has made mining his business, and is today doing more than any other to make Canada and Canadian prosperous.

MINING INVESTIGATIONS.

THE United States Bureau of Mines, of which Mr. H. Foster Bain is director, has issued a summary report of the principal investigations it is conducting. This report shows that a large number of technically trained men are carrying on work for the Bureau. Over three hundred investigations are under way. A great variety of subjects is covered, including such diverse ones as analytical distillation of petroleum, causes of death among coal miners, effect of furnace lines on blast furnace operation, methods of extracting pillars in coal seams, precipitating copper from sulphate solutions, ventilation in deep gold mines, application of military explosives to commercial purposes, prevention of losses in sluicing placer gravels, handling rock drill steel in mines, preparation of iron sponge, iron mining methods, shooting of oil wells, and air currents in metal mines.

The Bureau is evidently finding a great deal of useful work to do in the mines of the United States and in allied industries. The contributions of these investigators are quickly made available to the industry. Much work is done that is a benefit not only to the industry in the United States but to mining everywhere. The Bureau is doing good work and we have little doubt that its efforts are appreciated by United States mine operators. Many of the investigations are of importance to men in the mining industry in Canada, and the reports of progress are welcomed here. In the distribution of information, Americans and Canadians fare alike. We, working under pioneer conditions, cannot afford to undertake such extensive work of investigation as is centred in Washington; and we appreciate the friendliness of our neighbor.

THE GOVERNMENT GEOLOGISTS.

THE request for enlargement of the work of the geological department of the Ontario Department of Mines has been frequently made. The department does good work, and more is wanted. The staff is, however, too small to permit of its doing half the work that is asked for, work ranging from preliminary examination of new areas to detailed underground geologizing at mines. Most attention is paid to the geological mapping of new and promising mineral-bearing areas. A few areas have been mapped in some detail, and with these as keys, larger tracts are rapidly run over in an effort to guide the prospectors.

The results of this areal mapping have been very satisfactory. Criticism is often heard of inaccurate plotting or of rash statements made after brief examination; but on the whole the work is very well done and most of the criticism is based on the assumption that the mapping has been detailed. Only in a few areas has detailed work been attempted. The inaccuracies of the areal maps are for the most part the natural result of an effort to sketch boldly the outlines as a guide in exploration.

With its very limited staff the Department has evidently sought to assist prospectors rather than operating mines. This policy is generally commended, and the prospectors have made good use of the maps prepared for them. Tangible evidence of appreciation was given at the Ottawa meeting of the Canadian Institute of Mining and Metallurgy, when a well known prospector moved that a vote of thanks be tendered a well known geologist of the staff of the Department.

If the Department had a large staff it might be possible to do a greater variety of work, all of which would be useful to the industry. At the operating mines there is always something to be learned about

the character of ore deposits, and structural features are better understood as mining progresses. A good record should be kept of the geological information gained as mining proceeds, and to this end studies such as have been recently made at Cobalt should be carried on in all our important mining districts. If, however, such studies can only be carried on to the neglect of the areal survey, we believe that the latter should have the preference, now and for many years to come. Our geologists are mere humans; they cannot be underground and placing claim lines at one and the same time.

EDITORIAL NOTES.

According to figures just made public by the Dominion Bureau of Statistics, the total deficits for the past year on railways owned by the Dominion Government is $68,000,000. It is obvious that radically constructive measures must be taken to increase the earning-powers of these railways. The chief undeveloped source of non-seasonal freight lies in the mineral deposits in territory tributary to the railways. Facts and figures relating to this have appeared in these columns a score of times. It is surely the bounden duty of our Government systematically to investigate these possibilities. Not vivid imagination, but clear business vision is called for in formulating a policy that will put our vast systems of steam transportation on a paying basis.

A contributor in this issue suggests that prospectors and those directly interested in them should band themselves into an Association for mutual benefit and protection. It is not so generally known as it should be that there are already throughout Canada, local Prospectors' Associations. The latest addition, announced in last week's Journal, is on Vancouver Island.

The functions of these Associations have still to be clearly defined, and they need co-ordination. But here is the beginning of a movement that may work wonders in helping the genuine prospector and his financial backer.

The Journal wishes to add its congratulations to those of Mr. W. H. C. Mussen's host of friends. The removal of Mussen's Limited from the voluntary liquidation into which it entered in 1915 marks the accomplishment of an undertaking only too rarely entered into by men of business in Canada. Mr. Mussen has publicly vindicated his probity, which no one that knew him ever doubted, and his business ability, on which only the irrational and panicky conditions of 1915 threw any shadow.

PULVERIZED FUEL.

An Inexpensive Plant.

In this country, where metallurgical installations are liable to be small, it is of interest to have plants that are comparatively simple and inexpensive. The ordinary plant for pulverized fuel is rather complicated, and includes machinery for drying, crushing, pulverizing, conveying and storage. In the Foundry Trade Journal of January 12 is described a simple apparatus, built by Stein and Atkinson Limited, Victoria Street, London, S. W. It is in use with heating furnaces and steam boilers.

The unit is a pulverizing mill and fan combined, and consists essentially of a single steel casing containing three compartments, two with blades for crushing and pulverizing the coal, and the third with a fan. Part of the air required for combustion is admitted with the coal, and it is the speed of this stream, carrying away the fine particles,that regulates their size. The remainder of the air serves to convey the coal to the burners. The moisture, if not abnormally high, is vapourised by the heat generated in the pulvering chambers.

The particular installation described is a heating furnace for small ingots, ten feet by six feet. Slack coal is used, containing 23 p.c. ash and 10p.c. moisture. With the hand firing previously used, the furnace consumed 12 cwt. of the best coal per ton of ingots heated; only 3½ cwt. of the pulverised slack is needed now. The cost of power for the unit is 8s. 8d. per shift of eight hours.

COAL DUST EXPLOSIONS

Sir William Garforth, who died near Pontefraal, England, last October, as early as 1891 suggested the use of "stone-dust" for the prevention of coal dust explosions. Seventeen years later Sir William proved that coal-dust is explosive without the presence of gas. Next he proved that stone-dust would extinguish the flame of an explosion. He was also a leading pioneer in introduction of deep underemtting machines. His experimental gallery, erected to test breathing-apparatus, was the first ever constructed.

CONCERNING CHEESES

Prospectors, they may toast a bit
The engineer may crow,
The mill man may with pride be lit
But did you ever know
The plain geologist to brag
Or claim to be the cheese
Or chew the metaphoric rag
No, Sir! And, if you please,
Don't snicker, and pray do not laugh,
For what I say is true—
Geologists must stand the gaff
For me and them, and you!

ANON

The Prospector and the Grubstake

(Written specially for the Canadian Mining Journal.)

IF prospectors could be organized into an incorporated body, there is little doubt that they could bring suit successfully against the general public and against novelists and magazine writers in particular. The magnificent types of supermen, Galahads, parfait pinks of chivalry, indomitable two-six-gun men (that phrase doesn't sound quite right), knights errant, suffering and abused lovers, are some I have never seen or heard of in real life. They exist only in fermented imaginations and on the printed page. Action for libel would be sustained by any judge in Christendom—or should be.

Added to this, the general public, or that part of it that is interested in mineral deposits, thinks that the prospector has only to wander casually through bosky glades, encounter a vein, corrall it, and make the fortunes of all concerned.

Neither point of view is sane, and each is unprofitable.

Defining the Prospector.

The work of prospecting is as arduous, calls for as much constructive thought, as that of any other vocation or profession. It demands an unusual amount of initiative.

The good prospector plans carefully his season's campaign. His work is consecutive and cumulative. Gradually and painstakingly he delimits the areas that he intends to go over intensively. He depends not upon luck, but upon sound reasoning. He must be a practical geologist; but this does not imply that he is able clearly to put his geological thoughts into words, although often he can.

It is essential of course, that he be an efficient bushman.

Granting these qualifications, (and only too few men of this generation possess them), it will be admitted that the prospector is worthy of his hire, and of something more.

The Prospector and the Grubstaker.

We are enjoined in Holy Writ not to muzzle the ox that treadeth out the corn. Yet the man behind the prospector is only rarely willing to give him half a chance. This is a fact. One reason for it is partly indicated above. Another reason is that the grubstaker is often careless in the selection of his man, and thus fails to get a *bona fide* prospector. Perhaps he ties up with a man who intends only to have a pleasant summer at the expense of his partner, and who will loaf on the job without shame. The grubstaker is wholly to blame for this, but the *bona fide* prospector is the goat in the long run.

I believe that, except in extraordinary circumstances, no prospecting party should be sent out unless ample provision is made for keeping it in the field for at least two years, if not three. Provision should also be made for preliminary testing of the more promising claims that may be staked. In other words, a prospecting party should be organized and managed on business lines, and with an eye on possible future needs.

The qualified prospector puts into his work the experience of years of hard training. His proper occupation covers only part of the year. He is not a wage-earner. His object is to make a stake, and more often than not, to spend that stake in finding other saleable claims. Disappointment hit him harder than it hits the grubstaker. He must start all over again against the same chances of failure.

The Prospector's Guerdon.

It is my conviction, therefore, that there should be created a guild, or Protective Association, or something of the kind (so long as it has no kinship with a labour union), whereby recognized prospectors may be safeguarded. Legislation does not protect, because all such legislation can be evaded. But the prospector and the grubstaker can afford each other mutual protection.

Briefly, then, the grubstaker risks only his money. The prospector risks everything that he has and is. Fair play demands that he should be a partner to, let us say, the extent of from 25 per cent. to 50 per cent. in all valuable discoveries made. Circumstances may modify this arrangement. Yet I think it a good basis to work from.

I suppose that not more than one prospector in a hundred makes even a moderate stake. Yet good men are willing and anxious to take on the ungrateful task of making other men rich.

Coming To The Prospector's Help.

Information has come to me from reliable sources to the effect that the Dominion Geological Survey and the Quebec and Ontario Departments of Mines are this year making a special effort to delimit certain mineral-bearing districts for the express benefit of prospectors, to save them needless work and to give them sound guidance. This is good hearing.

I, along with my fellow mining men, devoutly pray for the time when governments, investors, mining engineers, and prospectors will realize that their interests are indissolubly linked together.

CAPRICORN.

NOTES FROM GOWGANDA

(Special correspondence.)

Things are looking up a bit in this district. The Miller Lake-O'Brien is producing steadily, although working with only one shift on account of power shortage. This could be avoided if available storage basins were not withheld from use on account of some departmental technicality.

The Castle property has been re-opened under the management of Mr. Murray Kennedy, brother of H. G. Kennedy, manager of the Miller Lake-O'Brien.

The Sanderson discovery at Wigwam is under examination by a well-known Montreal engineer.

A prospect at Silverado, about twelve miles south of Gowganda, has been under development for some time.

The re-staking of claims, following the recent cancellation of leases for non-payment of taxes, has been pretty extensive. It is understood that the development of some of the properties will be carried on promptly and vigorously by the stakers.

Sequel to Sinclair's "Jungle" Book

by "ARGUS."

SUDDENLY, and for reasons quite obvious (if unexplained), the "Standard" of Montreal (owned by the "Star") has begun to loosen depth bombs at the steel and coal companies of the Maritime Provinces. A special "investigator," actuated no doubt by humanitarian as well as economic purposes, asserts and insinuates that there is a new theme for a second Upton Sinclair in the jungle of Nova Scotia. There are "ugly, sinister stories" afloat about the "miseries," "gouge-games," "tyrannies" and other varieties of frightfulness involved in the management of mines and miners by the constituent companies of the British Empire Steel Corporation.

According to the preamble, "romantic history" and tragedy are so interwoven that the serial from the pen of the "Standard's Special Commissioner" is going to be interesting. He has undertaken to purge an Augean stable, and his river of words is gathering force and speed for the task.

The scene opens with the efforts of the poor-but-honest pioneers. The "Standard" generously concedes that Graham Fraser, Forrest McKay and James D. MacGregor were well-intentioned men,—but their like has not since been in that community. Heroes there were in those day, fit for the hard struggles they encountered. To quote the "Standard" without censorship, here is what happened:

"The real savior of the whole concern was Mr. R. E. Chambers, the gentleman who discovered and located the vast ore bodies at Wabana, Belle Isle. This saved the company at a critical period, although Mr. Chambers, at the present time, is not much in the limelight. The officials of the company never were burdened with much technical knowledge of steel making. During the years of Moxham's regime there was lavish expenditure and much waste. It is probable that the company's properties never really had the services of first-class technical experts. In the coal department there has been waste, and there is waste today in the methods of production. As a matter of fact, there is not a mine in Nova Scotia being properly mined, or properly equipped for mining. This is one of the things that the Government should thoroughly investigate. When Mark Workman took hold, his management was not popular in Nova Scotia, but it showed result and there was never any charge of mismanagement. The retirement of many Canadian business men of first-rate ability from the Board at the time of the merger has undoubtedly proved a great weakness. Some of those acting in Great Britain in an advisory capacity form another weakness. . . . . .

"Since the big strike of twelve years ago, Glace Bay has never been normal. At that time, and since, the suppressive power of certain factions, exercised over liberty of thought and speech, has now grown into a habit of mind. In Glace Bay today, you will find men unable to express their thoughts above a whisper—men cautious to the verge of timidity—men too frightened to declare their convictions. To these men, heedless outspokeness would seem the height of folly, to these men, prudent silence would seem the only way to avoid innumerable risks, **mysterious hidden dangers.**"

There are many counts in this indictment—and more to follow. Following the line of departed heroes there has been a succession of lesser administrators—Cantley, Plummer, Crockard, Fergie, Workman and others still within the jurisdiction of terrestrial courts. Among all these, only the "Knight of the Goose" has won the "Standard's" approval. The "Standard" will not accept the contemporary judgment of their peers as to the professional qualifications of these leaders in industry; the "Standard" deems them unworthy successors of men of "integrity and considerable business ability." So be it!

It is rather startling to find that "first-class technical experts" were never retained to advise the several companies. A number of the most eminent engineers have been bought for consultation from Britain and the United States, where their reputation has been of the best. It is a certain satisfaction to discover, through the columns of the "Standard," that these engineers have fooled not only Nova Scotians, but their own countrymen as to their attainments.

The "Standard" brings an additional charge against the "many Canadian business men of first-rate ability "who" retired from the board at the time of the merger" a few months ago. It professes to admire these men; but actually it points out that "the miserable condition of present-day Glace Bay," a town of "mysterious hidden dangers" where "you will find men unable to express their thoughts above a whisper," was brought about during the years when these men *were* on the respective boards, and responsible for the alleged mal-administration. The "Standard" has launched a javelin that turns out to be a boomerang!

Seriously, such stuff as is offered to the public from the pen of this "Special Commissioner" impugnes the intelligence of the average reader. It is calculated to excite the imagination of "Reds" and others of unbalanced temperament. It is a deliberate attempt to excite class jealousy and [illegible]. It shows an ignorance of the facts of the case, [illegible] nearly the engineering facts, that would make a [illegible] merely smile were its influence not likely to mislead the uninformed.

Ex parte accusations anonymously made are not decent propaganda, and should not be taken too seriously. But in the present disturbed state of industry and of men's minds, stuff of this sort is intolerable even in the pages of the "Standard."

In the Katanga region of the Belgian Congo a tremendously large copper field was located by one George Gray, twenty years ago. A group of British and Belgian investors, operating under the name of Union Miniere Tanganyika, has opened up and equipped the property, made connection with ocean ports and prepared for production on an immense scale. Work has proceeded for years, despite the decided adverse report of a prominent mining engineer some time ago. In the year 1914 a consulting engineer was engaged whose duties consisted largely of following progress made in treating copper ores, particularly in the United States. It has been decided that a leaching process is most suitable for the treatment of the Katanga ores. The Company, therefore, is developing large water powers and preparing for an output of 50,000 tons of copper per year. It seems highly probable that this enterprise will rival in importance the largest of the Western United States porphyries.

Tinkering With The Wages Dispute

By our Nova Scotia Correspondent

The struggle over the wage question in the coal industry of Nova Scotia seems to have entered upon a new phase and the industry itself is to become a political football during the coming weeks. It was just beginning to break in on the minds of the mine workers that the laws of trade cannot be side-stepped and the peak wages of war could not be maintained, when a new factor appeared to keep the trade in turmoil and the colliery districts in continuous ferment. The result promises to be an almost idle summer at the collieries and undue advertising and exaggerating of alleged bad conditions existing at every colliery town in the Province. The whole nation will be asked to shed tears over the miners of Nova Scotia, who, as a class, are much better off than most elsewhere.

Had the miners been left to fight out their own battle without government interference, the stability of the coal trade of the Province would have been assured for years to come, and miners would have settled down as good citizens whose occupation is to mine coal rather than agitate to lower production by "striking on the job."

Not satisfied with the award of a Conciliation Board, the senate of Canada resolves to appoint a commission of enquiry into the wage question, and the Government offers to reconstitute the Gillen Board. It will take weeks to get the machinery in operation and the end of the whole business may be just as unsatisfactory as was the first award of the Gillen Board.

Meantime Nova Scotia will have had a lot of free advertising as the land of the slave, while the whole country waits patiently for lowered coal prices and cheaper fuel. How this is to be brought about is puzzling to the minds of those who have an expert knowledge of the coal trade. Markets which all along have been claimed by Nova Scotia have been invaded, and it appears only a matter of time when these will be lost for good. Foreign coal is being landed in St. John, N. B. and in Halifax. Large unloading plants are being erected at St. John; storage ground has been bought and preparations made for conducting a permanent business. That a part of the coal market can be filched from Nova Scotia at a time when collieries are only working half time, and some of these attempting (though not succeeding) in carrying out a "striking on the job" policy, is an unmistakable warning of danger. The difficult conditions of coal mining in Nova Scotia place it at a disadvantage with American coal, but we should expect to hold our own against American and British coal in ports close to our mines. If we cannot do this, how can we capture territory further afield? It cannot be done so long as the coal industry is made a bone of contention to further the interests of some political party. "Hands off" shuld be the policy of all Governments at a time when the revival of trade depends largely on cheap coal and lower railway freight charges.

Looking back over the past three months, one sees two large, well-organized bodies coming together to try to find common ground for a wage agreement. Pubic sympathy strongly favored the United Mine Workers because it was generally thought that the wage reduction was too great.

The Empire Steel Corporation, like all hugh concerns, was feared, and we do not love the thing we fear. Public sympathy was against it. The parties failed to find common ground for an agreement, and the dispute was placed before a Conciliation Board. The findings of the Board favored the men, but even then they would not accept the award. The public still clamored for a further conference between the company and the men. Both parties were agreeable and a new offer was made by the company, which brought the wages up to a higher level. A wage agreement was signed. This was subject to a referendum of the Union and was defeated. On none of these occasions had the union made the move that brought on the conference.

This unbending attitude on the part of the workmen alienated public sympathy, which shifted to the side of the Company. The Secretary of the district openly advocated "striking on the job" and publicly insulted the Premier of the Province and the Minister of Labor. This outrage of moral feeling disgusted all good citizens and changed the question at issue from the material one of wages to one of public morals.

The first question now to be settled is whether any man is to be permitted to openly advocate the destruction of an industry because it cannot pay the wages demanded by an unreasoning and ill-advised labour union. The question of good citizenship is before all other questions, the first one to be settled, and any attempt to pass it over will leave the mining towns of Nova Scotia a prey to every ambitious and selfish agitator that comes along.

To the credit of the International Union in the United States, it is opposed to the pernicious practice of "striking on the job." The Sherman Act is aginst restricting production, by either monopolies or labor unions. We, in Canada, seem to have no such law and rely on public sentiment to frown upon conspiracy to restrict output. But public sentiment has failed on this occasion and as general sentiment is the basis of law, why not crystalize it into life and action? This gain alone might mean much for our country in future labor struggles.

With our knowledge of labor conditions in Nova Scotia we are safe in saying that interference by any party at this time will establish a precedent of which labor unions in the future will take advantage. No dispute will be considered settled until it has passed before Conciliation Boards and Royal Commissions and been reopened and reviewed until the public becomes weary and disgusted with the whole procedure. Then competent men will refuse to serve on Boards or Commissions to adjust labor disputes in Nova Scotia.

We are more than three-forths of the way through the dispute. Why not let us finish it and be done and let each party take what is coming to it?

The principal market for the iron ore of Scandinavia is in Germany. The financial disabilities of Germany since 1914 are well illustrated by her imports of iron ore from Norway. These dropped from over 300,000 tons in 1914 to 25,000 tons in 1919. In 1920, though, German iron-masters were evidently once again able to satisfy the Norwegian exporters as to their ability to make payments, as the imports of ore jumped suddenly to over 200,000 tons.

The Late John Ballot of Minerals Separation

By ALEXANDER GRAY.

JOHN BALLOT under whose direction Minerals Separation by Oil Flotation wrought a revolution in modern recoveries, died in New York City on April 1st., after a lingering illness. Associating with him was Claude Vantin, and it was they who financed and perfected the processes that made practicable those economies without which the metal industries would to-day be infinitely less prosperous. His charming personality, business acumen and scientific precision, and Vautin's genius as a metallurgist, brought success where recurring disappointments would have discouraged the less resourceful. Mr. Ballot lived to see only partial fruition of this work, though flotation has been adopted by nearly all the greatest copper producers and by numerous producers of other base metals. Mr. Ballot was further rewarded by seeing it applied to coal, and now as he dies, its application to precious metal ores appears to be assured.

Twenty years ago John Ballot was urbane but lonesome. A native of Cape Colony, closely identified with South African mining developments, his smile was a benediction. His silk hat, round and neatly-groomed figure were to be seen everywhere in "the City." Flotation was his theme in and out of London Wall, Cornhill, and Throgmorton street. As usual, London was somewhat incredulous and wedded to its idols. It mattered not what others had indicated in the Elmore and other contemporaneous results, or what Vantin's research had determined.

Mr. Ballot's money went with his confidence. Loyal friends co-operated; yet the main factors in metropolitan mining circles kept aloof. Dusseldorf was observant; Swansea indifferent. Inevitably Mr. Ballot had to "plow the lonely furrow." His optimistic equable temperament was tested. Eventually he confounded his friendly and unfriendly critics, and Minerals Separation was accepted without cavil from Broken Hill to the Britannia Mine in British Columbia.

No metallurgical development (unless it be the adaptation of the cyanide process) involved more bitter controvery and persistent litigation. Throughout it all, Mr. Ballot preserved his characteristic serenity, without surrendering any of the rights of himself and his associates. Where Elmore failed at Broken Hill, Minerals Separation succeeded. That is another story, it brought animosities. Concentration of mind and money upon the flotation and concentration of minerals left no room in Mr Ballot for resentment. When he was forced to fight, he fought, though his suavity continued unperturbed.

Millions have been expended in contesting the Minerals Separation patents, and in defending them. Hundreds of millions hinged upon court decisions. Courts of all degrees have looked into the antecedents of the Mineral Separation Processes, and have tried out the claims of rivals. Mr Ballot steadfastly maintained the integrity of his position. Vindictiveness could not exist in him. When he could, he played a magnanimous role. When he was struck fouly he left nothing undone to send his opponents to the corner for the count—and he got the count.

During the Great War, Minerals Separation was assailed at Washington and in the press with a venom that rankled in Mr. Ballot—ever the most patriotic of Britishers. It was charged that Minerals Separation, was under alien enemy control. Nothing could be more libelous. Germany, it is true, had foreseen the results of the Ballot-Vantin research, and had taken over from England the mastery of metal markets (through default on the part of England) but there was never a minute when Mr. Ballot was not 100 per cent. true. He opened his books to Ottawa. On one memorable occasion, with which the writer is very familiar, Director Van Manning at Washington had opportunity to bear testimony to the splendid loyalty of Mr. Ballot, who tendered to the United States Government "every facility owned and controlled" by Minerals Separation, for War Metal purposes, leaving it for the Goverment to fix the remmneration. Thereafter, Minerals Separation could not be traduced.

Perhaps it is too early for the revelation of state secrets, and the discussion of delicate subjects. Mr. Ballot was generous in compromise and unrelenting in a fight. Minerals Separation was his life work. It made him more than a millionaire—an unpretentious, lovable millionaire. To have had his confidence in times of stress was a priceless trust. He detested obliquity; but when put upon, he exacted the penalty in full. That is why Minerals Separation fought it out rather than acquiesce in what he considered unsportsmanlike conduct. When he was asked if he would let by-gones be by-gones, and give his opponents the same terms as the Anaconda, Inspiration, Phelps-Dodge Clark interests, he recorded a vigorous negative. John D. Ryan, Ex-Senator Clark, and the Phelps Dodge people had been graceful in their recognition of the rights of Mineral Separation.

Toward Canada, Mr. Ballot preserved an affection, for it was at the Britannia Mine in British Columbia that his flotation methods were first applied on this continent. Latterly he was specially concerned with the solution of Canadian Mining and Smelting problems at Trail, and to that end Minerals Separation technical staff devoted itself. Concentration and flotation at Trail having made the Trail metallurgical works an international institution, Mr. Ballot took pride in the result and was unstinted in his commendation of the enterprise of the management. Withal, Mr Ballot was as modest as he was masterly. He was quietly great.

At one of the oldest glass factories in Bohemia, after many years of experiments, a glass has been produced which, it is claimed, is absolutely unbreakable, says the London "Times Trade Supplement."

Receptacles made from the material, it is said, can be thrown about, made red hot and then put into cold water and yet do not break. It is claimed that hammers made from the material can be used for ordinary purposes. It is difficult to cut even with a diamond, while the ordinary carborundum stones are useless for the purpose.

The original founder of the factory whence this invention emanates was an ordinary glass worker who rose to fame by his production of [illegible] glass. It is important to note, however, that this invention can only be placed upon a commercial basis when a special kind of sand has been found and is available in large quantities. At the present time the sand is said to exist only in the neighbourhood of Dresden in comparatively small quantities.

Dog Days in the Nickel Industry

By ALEXANDER GRAY

DURING the twenty years since the International Nickel Corporation was incorporated in New Jersey, the graphic curve of Nickel Copper production, has all the acute angles the most ardent cubist could wish. No switchback has ever had more thrills and chills.

Starting with a metallurgical Ishmaelite, full of the "Old Nick," the special industry centered in the Sudbury District of Ontario has been a stormy petrel to its chief patrons and to politicians. Nickel has always, until now, been associated with the War spirit. That nickel alloyed with steel kept the ensign at the peak and sent enemies to perdition, seems to have been the greater reason for changing with every crime in criminal code those that developed the mines and perfected processes for its industrial application. If nickel had not been identified with armor-plate; had it not been a martial metal; were it clear to the popular mind that nickel always was destined to become a prime factor in widespread industrial economies, about twenty years would not have elapsed between Howie's discovery in the Canadian Pacific Railway cutting and the incorporation of the International Nickel Company, and it would not have required a further twenty years to convince all parties that the industry cannot be subjected to perversity, adversity, and recurring manifestations of resentment of its existence. Notwithstanding all of which to the end of last year it had produced:

Nickel	$169,675,494
Copper	58,721,361
Total	228,396,855

A minor fraction of those totals is to be credited to spasmodic production of copper in districts other than Sudbury. Metallic nickel, oxides and other compounds, have been recovered in incidental quantities from silver-cobalt-nickel ores, and from the Alexo and a few outside properties. The great bulk of the metals, however, came from the Sudbury norites, and as the grand aggregate represents government valuation rather than the selling price, we can gauge conservatively what it is we owe to those that fostered the ugly duckling because they could not get rid of it and recover their capital. The spending power of the industry is eloquently indicated in this partial presentation of the wage bill since the panic of 1907:

Years.	Wages	Number Employed.
1908	$2,159,055	2414
1909	2,605,128	3251
1910	2,973,172	3317
1911	1,830,526	2439
1912	3,543,419	3746
1913	3,291,956	3512
1914	3,424,352	3859
1915	3,835,179	4538
1916	4,920,720	5306
1917	6,113,572	3747
1918	7,983,526	4378
1919	4,139,523	3004
1920	6,704,883	4007
Total	$53,525,011	

There are pages in history that might as well continue turned down. Excepting as a harrowing chapter, events of the first two decades need not be recalled. There were no ecstacies. For years after the organization of the International Nickel Corporation there were no dividends upon preferred and common stock issues. So the records of the thirteen best years and what they meant in wages should not be used as an argument why the industry should be pilloried and penalized, misjudged or subjected to animadversions. In 1903, 1904 and 1905, the International company earned 6.3 p.c., 3.8 p.c. and 7.4 p.c. respectively on the preferred stock. In 1906, 8.4 p.c. was earned on the common. Just as it seemed that the organization was about to give some return, and 1907 showed 14.2 per cent. on the common, the panic upset calculations; consequently we have the foregoing table of wages paid as a reflection of later progress. Including the lean and fat years, though, between September 1902 and December 31st, 1920, this is what went out in behalf of mining and smelting operations exclusively in the Sudbury district:

Outlay on Mining and Smelting.

Labor and salaries	$35,913,755.32
Mine supplies	13,915,453.36
Coke	6,485,869.68
Coal	2,439,408.24
Wood	685,578.31
Freights	11,736,230.97
Contractors	2,014,233.77
Total	$73,190,529.65

As applied to those items and their grand total (for mining and smelting purposes solely, without reference to refining, marketing and administration) it is worth noting that 10,500,000 tons were mined while that money was being expended; so it follows that each ton meant an expenditure of $6.96, irrespective of all else. The present day inventory of $19,000,000 of which $1,600,000 is in dwellings, the hospital, schools, churches etc.; the pure water system, costing $170,000 (for life of five communities) bespeak some of the achievements resulting from the advent of those married-in-haste Ohioans who thought they had unalloyed copper fields and discovered they had the Devil's Own complication to deal with. No better epitome of the benefits accruing from the nickel-copper industry can be offered than the foregoing table and this statement by the recent Royal Ontario Commission appointed to consider the whole subject:

"It should be pointed out that the mining industry is one of the most effectual agencies in the settlement of our northern and northwestern districts. It affords employment to labor, frequently on a large scale, and provides the best kind of market for farm produce and manufactured goods. Not only the tillers of the soil, but the artisans and merchants of the older parts of the province derive a benefit from the increase arising out of the mining industry. That this benefit is large, may be judged from the fact that on a close estimate it takes ten million dollars to pay the wages and provide the supplies for the Sudbury nickel mines for

twelve months. The railway companies also feel the effects in a larger volume of business."

Through the courtesy of the International Nickel Company of Canada, in furnishing the figures quoted, we are enabled to verify the generalizations of the Royal Ontario Commission. How much more has gone and is going toward the Port Colborne Refinery that cost $6,000,000, need not be surmised. Recent developments on dams and a water storage system cost another $3,200,000. The plant at which Monel metal will be rolled is being constructed and will cost a further impressive amount. Probably that will be the last large capital expenditure; but in this connection it is as well to state that the International Nickel corporations are not borrowers. Red ink there has been in the books. However, all construction has been and is being paid for out of surplus, and what profit there is in current operations. How thorough-going are the methods of conducting International affairs, is evidenced in the following:

Disposition of Finances 1903-1920 Inclusive

Total income after charging manufacturing, selling expenses and repairs	$112,713,256.41
Administrative, head office expenses, and capital stock, corporation, United States and foreign taxes	14,937,508.46
Depreciation of plants and mineral exhaustion	16,939,726.16
Bond sinking fund and interest on bonded debt	6,440,243.31
Net profit	74,302,314.72
Preferred stock dividends	7,753,847.99
Common stock dividends	48,892,180.11
Balance to profit and loss	19,874,367.78
Expended on additional property, construction, equipment, less recoveries	25,746,547.92
Current assets	12,600,540.34
Cash, loans on call, certificates of deposit, government securities, at end of year	5,289,537.45

All bonds were retired in 1913.

It is a coincidence that the net profit of $74,302,314.72 to the International corporations, closely approximates the amount expended by the producing organization in the Sudbury District, $73,190,529.65. Not until 1906, a fifth of a century after the Howie discovery in 1885, was a dividend paid on the preferred shares of the International. The first dividend was paid in 1910 on the common shares. The latter, to the end of 1920 had brought their holders $29.22 per share and it took eighteen years to do that.

Present Position and the Future.

It is not necessary to become doleful over what is now happening. The past record of the International and Mond companies does not call for sentimentalities or "sob stuff". The International, has mined 10,500,000 tons, paid for whatever there is in plants and equipment, is in ample funds, the unparalled Creighton Mine has an estimated ore reserve of about 10,000,000 tons, and there is no doubt a further supply awaiting determination. At the Frood Mine section there is said to be another substantial asset of a probable 70,000,000 tons of disseminated ore that will average around 4 per cent. combined metals. It is this knowledge that lends an element of under-valuation to formal announcements of Messrs Hayden, Stone & Co., the senior member of which firm is the chairman of the board of the International Nickel Company of New Jersey, such as the following:

"The proven ore of the Sudbury district can be conservatively estimated at 70,000,000 tons. Of this amount the Creighton, Frood and Crean Hill mines belonging to the International Nickel Company, contain ore reserves of approximately 57,000,000 tons.

"The Creighton is the greatest nickel mine in the world and it is supplying the bulk of the world's output of nickel, which aggregates about 70,000,000 pounds per annum. The average grade of the ore extracted from this mine from 1903 to 1915 was 4.43 p.c. nickel and 1.56 p.c. copper."

Messrs. Hayden, Stone could have added that the Creighton contributed more than 5,000,000 tons of ore since the outbreak of the war. In that time well on toward $1,500,000 was expended upon the Creighton plant, —a plant that caused the late Governor General while on a visit, to squint at the headframe, shaft houses and the surface establishment in general, and to exclaim, "Well, someone must have a lot of confidence in this property." His Excellency was not far wrong. Between 300,000,000 and 400,000,000 pounds of nickel have had the Creighton hall-mark upon them. Without the Creighton—well, the tale might have a different telling, as other producers will attest. Here the graphic curve may be availed of. In 1902, the total tonnage treated from all sources in the province, was 233,388 tons; 1903, 220,537 tons; 1904, 102,844 tons; 1905, 257,745 tons; 1906, 340,059 tons; 1907, 359,076 tons. Starting with 1907, the International company treated 303,000 tons on individual account. Then the panic disturbed the trade. In 1910, 508,000 tons went through. Brightening skies were beclouded by the War; only 199,000 tons was smelted in 1914. Two years after, the Allied demands necessitated the treatment of 1,100,000 tons; 1,168,000 tons in 1917, even in 1919 the total was 1,093,000 tons.

Amid the Encircling Gloom.

Whereupon the nickel industry fell upon evil days. It was taxed a plenty and to spare, and surtaxed, notwithstanding it had consistently declined to raise the price of nickel during the war. Dominion, Provincial, Municipal taxes, pressure for plant expansions, provision of the refinery at Port Colborne that can supply the world's requirements in any emergency, costs and continuely from where encomiums should have emanated, sent the serenities to the demnition bow wows.

Yet Hayden, Stone, presumably speaking [illegible] wrote a year ago of the nickel outlook:

"The future of industry can often be forecasted fairly accurately by a study of its past record."

Not so long ago the possession of a nickel mine was considered the doorway to wealth. Areas supposed to rival any or all of the producing mine were tentatively held. Prominent Canadians enlisted the help of overseas capitalists, including Norwegians who are producers in nickel, the Imperial Government lent their patronage, and what was considered a rival to the International and Mond companies was launched upon a tidal wave of prosperity in the British American [illegible] seeming abundant acreage, including the Murray Mine. The plea in extenuation was that the British American would safeguard the Empire in all events. Conse-

quently the enterprise was greeted with approval, regardless of cost and despite a doubt as to the grade of its ore, unless improved processes and continued prosperity attended the whole nickel business. Before it had been demonstrated that the mines and plant were ready to operate profitably, financial difficulties necessitated reorganization, and then the suspension of operation. This was due to the fact that governments and the other large producers had more nickel on hand that the world required, or would take during the coming period of depression. If there was anything the nations were not short of after the Armistice, it was nickel. The International refinery at Port Colborne was temporarily, like Potash & Perlmutter's two cylinder Cadillac "liability—not an asset." Nickel ingots were piled up there and at the Constable Hook refinery of the International, the Allied nations were jettisoning their over-supply of the metal. Mond and Brunner-Mond specialties have softened somewhat the asperities of the situation, but the former company still has a quantity of metallic nickel awaiting markets. As the International people have an aggressive organization, their surplus stocks on hand have begun to move. The stocks in Canada have been augmented by the dismantling of the Constable Hook refinery, and it will be some time before any of the producers are in a position to give the "all clear" signal. Only the Mond plant at Coniston has a furnace going. The all-round readjustment cannot be hurried. What the demand for the metal is going to be when the pendulum is swinging the other way, is something about which none of the parties interested are venturing prophecies.

Monel Metal To Arrive.

One certainty is obvious: The International will not stand on ceremony when the log jam breaks. It is selling nickel, and its objective is to occupy its field, the high-grade character of its ores and its modern metallurgy leaving no misgivings as to the adequacy of profits from the output, when that output is as large as it should be. There is at present a feeling among the producers of nickel that their continued operation is handicapped by undue taxation, at a time when the nickel industry is harder hit than any other branch of production or trade. As a matter of fact, the use of nickel and its alloys calls for an intensive and expensive campaign. Sudbury and surrounding communities, including farmers, are in hearty accord with nickel producers, because they find their markets at zero and their customers without the wherewithal to buy. The most obstreperous who raved about fumes are as impatient to have roast heaps in action and smoke stacks belching, as they were about the destruction of vegetation. Executive officers are grim. Staffs are depleted, dwellings are unoccupied, or their occupants have to be leniently dealt with. Copper Cliff is a model residential town with a decimated population, part of which cannot go elsewhere lest the change be "out of the frying pan into the fire."

International Nickel organizations cater to wide and diversified markets. They are anticipating the popularizing of their Monel metal, a natural alloy of which Hayden, Stone write:

"It contains about 67 p.c. nickel, 28 p.c. copper and 5 p.c. other metals. It is as strong as steel, non-corrodible as bronze and more durable than either. It is manufactured in the form of rods, castings, forgings wire, strip stock, sheets, etc., and is used for permanent roofing, propeller blades, valves, bolts and nuts, shaftings, pumping rods, etc."

To meet the market anticipated for this alloy, a large rolling plant is nearing completion. Besides, the intention is to press the consumption of nickel-silver alloys for tableware and for electro-plating. At the same time it is recognized that nickel-steel is a prominent factor in modern construction. It combines strength and ductility, and has proved its usefulness in bridges, locomotive forgings, automobile parts, electric rotary gears, marine engine works, stationary engines, and a host of diversified product. A recent list of the uses for which Monel metal is applicable, includes in part; turbines, refrigerators, filtration equipment, perforators, milling machinery, welding equipment, wire rope, rolled anodes, cast anodes, crucibles, wire cloth, castings, hot rolled sheets, chains and fly screens. Considering that it was a very few years ago that Monel metal was first drawn, the infinite variety of its uses to-day sustains the confidence expressed in its future.

What Research Is Doing.

Research departments have proved the quality of Monel in amalgamating apparatus where metals come in contact with mercury. Filter presses handling corrosive liquids, in the beet sugar industry for example, have made the metal a favorite. Likewise with filter cloth. Wherever acids are present, as where diamond dies are used for wire drawing, in sugar pumps subjected to the cutting action of sugar crystals, for "doctor plates" in pulp mills, or in the manufacture of "white gold," nickel and monel metal are given preference. Nickel cast iron pistons have become a feature of the automobile trade. It has been found that nickel provides greater hardness and resistance to oxidation at high temperature, which has opened up a possibly large market for stove iron and similar services. Nickel for annealing and carbonizing boxes and cyanide pots is being tried out with most favorable results. It may be that "white gold" will be in greater demand from jewelers. It includes 20 p.c. of nickel. Sheet Monel suggests a broader field in the washing, dairy and dyeing industries.

The Wilson Welding Company recently discovered a heretofore unknown property in Monel. It seems Monel can be used in welding cast iron with very much better results that any other welding wire, for it acts as a scavenger in absorbing the carbon from the iron and prevents the hard spots and brittleness so often found in electric welding of cast iron. Perhaps the latest development is that of a high tensile Monel in the form of rods, which has a tensile strength of around 150,000 with a yield point around 100,000, together with an elongation in two inches of 25 p.c. This, it is said, can be machined and forged readily, is non-corrosive, and can be specially adapted for turbine blades. Iron-nickel alloys with from 25 to 75 p.c. nickel, are represented as having rather remarkable electrical mechanical and thermal properties. Developments long this line of research are looked for in the near future.

It is not the intention to catalogue the potentialities and practiced adaptions of nickel and Monel metal. The idea actuating this review is that the Nickel Industry is showing renewed and continued initiative, without which the scrapping of navies would also involve the scrapping of the industry.

Nickel, nickel-steel, Monel metal, malleable nickel, in the form evolved at the Mond or International works or elsewhere, will surely find markets, when the world has ceased to worry and the wicked are at rest, (which latter includes overtax overlords). There are strenuous times ahead in Nickeldom.

The News of Mining

Great Britain supplied 15 per cent of Switzerland's coal imports in 1920, and 19 per cent. in 1921. The returns for 1921 show that 202,553 tons come from Great Britain, 259,343 tons from the United States, and 265,691 tons from Germany.

Austrian production of coal amounted to 2,600,000 tons during the year 1921, an increase of 170,000 tons over 1920.

Egypt imported about 900,000 tons of coal in 1921. The greater part of this came from Great Britain and the United States.

In the coal mining districts of Lanarkshire, Scotland, the cost of living is still 88 per cent. above prewar level, according to local authorities.

Approximately one-sixth of all coal used in Great Britain is consumed in private dwellings, of which there are about ten million.

Total accidents in the collieries of Great Britain numbered 1.26 per 1,000 persons employed. In the year 1920, they numbered only 0.88 per 1,000 persons employed.

A suit brought by the Cape Explosive Works (South Africa) against Lever Bros. and the South African Oil and Fat Industries, failed in the Supreme Court, at Capetown recently. The point at issue was the fact that the defendants had agreed to deliver crude glycerine for use in the manufacture of explosives, at a fixed price. When, later, the British Government raised the controlled price of glycerine, the defendants raised their prices correspondingly. It was held by the court that as there had been no misrepresentation, the defendants were not liable.

The Ontario Government is planning to provide facilities for the sale of small lots of ore by prospectors. Small lots of ore will be accurately sampled as they arrive and will be stored at the Temiskaming Testing Laboratories until one or more carloads have accumulated. The ore will then be sent to a suitable mill for treatment. This will assist in sampling properties and in helping the prospector defray expenses.

The only producing oil well in Great Britain is situated at Hardstoft, in Derbyshire. It was put down for the British Government. During the latter half of last year, it produced 78 tons of oil.

German contracts have been placed for 800,000 tons of Wabana (Newfoundland) iron ore. It is reported that contracts for 1,000,000 tons yearly are being arranged.

The United States Steel Corporation expended $1,061,685 on safety work during the year 1921, and in the same year paid out $1,109,211 in accident insurance.

Colonel Grenfell, chairman of the Messina Copper Mine, South Africa, in an official statement, states that high working costs and taxation have made the mine unremunerative. He asserted that the Messina can be run with a complement of fifty white and eighteen hundred natives, but before the mine was closed the company had been forced to employ 170 white men at wages 50 per cent. above those current in 1914. This was too high a proportion of white labour.

Hon. James Murdock, Dominion Minister of Labour, severely arraigned organizer McLachlan, the advocate of the "loafing on the job" policy amongst Nova Scotian coal miners. Speaking in the House of Commons on March 30, the minister urged the need of combating any such policy without reserve or equivocation. He charged that the same tactics are now being used in the Nova Scotia strike as were used during the war by the I. W. W.

Seven years ago, Mussen's Limited, a prominent firm in Montreal, dealing in mining and contractors' supplies, went into voluntary liquidation. At that time their assets exceeded their liabilities by $250,000. But business was stagnant and the firm's assets could not be quickly turned to cash. On March 31st, Mr. W. H. C. Mussen discharged the last of the firm's outstanding obligations, according to promise. This is a rare and creditable example of business honour.

In a hearing under the British Safeguarding of Industries Act, some interesting data are presented in connection with the manufacture in Britain and in Germany of domestic aluminium ware.

There are now thirty manufacturers of aluminium hollow ware in Britain, compared with twelve before the war. Their product is characteristically of heavy gauge, highly-polished, and of thorough workmanship. There is a popular demand for lighter and cheaper utensils, and this is being supplied from Germany. That the possibility of competition from Germany is due to the depreciation of the German mark, seems to be indicated by the fact that the price of Canadian and American aluminum is higher even than in Britain. In spite of this, American manufacturers of aluminum ware are under-selling all their competitors in India and the Eastern market—presumably part of a determined effort to capture this market for the United States.

Canada is now one of the world's chief producers of ingot aluminium, and has an increasingly large interest in the world's aluminium trade.

In the same way that the discovery of [illegible] in Sheffield reinvigorated the Sheffield cutlery trades, so the discovery of a new non-ferrous alloy of nickel that does not readily stain or tarnish has caused activity in sections of the electro plate [illegible]. So great has been the demand from shippers, retailers and the general public for spoons and forks and hollow ware of the new product that stocks have been exhausted at some of the works, and the makers of the product are installing additional plant to cope with the demand.

British Columbia Letter

Will Explore Coal Lands

Coal lands situated in the Copper River District, northern British Columbia, are to be subjected to systematic exploration by the National Finance Company Ltd., who are acting as liquidators of the Yorkshire and Canadian Trust Ltd. This announcement was made recently in the course of an application before Mr. Justice Murphy of the Supreme Court of the Province for permission to proceed with diamond drilling. That there are 15,000,000 tons of coal actually proven and that in the region in question and that adjacent there are estimated to be reserves running between 300,000,000 and 500,000,000 tons of coal were statements made by counsel. It was shown that creditors representing a considerable block of the liabilities against the defunct company were in favor of the proposed work, the cost of which is placed at $18,000. While the judge could not see his way clear to granting the application until all creditors were notified of the proposal it is not thought that any difficulty will be met with as the purpose is to keep the holdings in good standing as to government requirements and to so demonstrate their value as to make it possible to effect a sale on terms commensurate with their possibilities.

Northern Coal Areas

Activity in the development of coal areas of northern British Columbia has become more marked in the past two years, chiefly for the reason that with the growth of Prince Rupert, and of settlements along the line of the Grand Trunk Pacific Ry., the local domestic market has materially expanded. Although the mines are being worked in a small way as yet, and notwithstanding the lack of good transportation, the fuel can be produced and sold much cheaper than that imported from the collieries of Vancouver Island. In time there is no doubt that this coal, which is a high grade bituminous with first class steaming qualities, will find a considerable mercantile market. The citizens of Prince Rupert have been agitating for the construction of bunkers at that port to permit the development of such a trade.

The Betty Mine, known as the Aveling property, and situated about six miles west of the town of Telkwa on the G. T. P., is the only mine actually in operation at present. Within the past year there have been shipped, chiefly to Prince Rupert, from this source some 20,000 tons of coal. Only five miners are employed and the hauling to the railway, a few miles distant, has been done by horse and wagon.

The Telkwa Collieries Ltd., whose coal seams are found on Goat and Mud Creeks not far from Telkwa, was the first property to be opened up in the district. Already development represents an investment of about $20,000 and 75,000 tons of coal has been shipped. Work has been suspended pending the building of a spur track to the mine.

There also is the property of the Prince Rupert Collieries, whose holdings are 37 miles west of Telkwa. In this connection it is the desire of the owners to obtain the contruction of a branch line of railway to the measures. The field is an extensive one and, if the mission of those now engaged in representing the situation to Dominion Government officials is successful, the opening up of the coal resources of the north country in a large way is assured.

Coal Industry Problems

Problems connected with the coal mining industry of Vancouver Island, such as the effect of fuel oil competition, the possibility of popularizing pulverized coal, and the utility of improved methods of flotation and hydrogenation of coal, were discussed at a recent meeting of the Vancouver Island Division of the Canadian Institute of Mining & Metallurgy held at Ladysmith.

Thos. A. Spruston, superintendent of the Wellington-Extension Colliery of the Canadian Collieries (D) Ltd., presided and among those who gave addresses were Col. J. E. Leckie, Dean Brock, Dr. Hanson, Messrs H. Mortimer Lamb, N. Thompson, and E. A. Haggen, representing the Vancouver Branch of the Institute; and Kenneth Duncan M. L. A., Duncan; Mayor Walkem, Ladysmith; and C. M. Campbell, manager of the Cassidy Collieries, Granby Consolidated Mining & Smelting Co.

Recent developments in connection with the coal mining industry of Vancouver Island are encouraging. New deposits of coal have been opened up in the Reserve Mine, Western Fuel Corporation of Canada, and the Farm Mine, Comox, Canadian Collieries (D) Ltd. The collieries have been working steadily and the output is being well maintained. The domestic business has been good but the bunker sales weak, this because of the holding up of trans-Pacific shipping in Oriental ports. It is not anticipated that the mines of the island will be affected by the strike of bituminous miners ordered for the 1st of April, the wages being regulated still by the Dominion Fair Wage Officers.

The production of British Columbia coal mines for February follows:

Output of Coal for B. C. for the Month of February, 1921

Vancouver Island District

Mine	Tons.	
Western Fuel Corporation of Canada Ltd., Nanaimo	56,313	
Canadian Collieries (D) Ltd., Comox	30,360	
Extension	18,962	
South Wellington	7,630	
Granby Consolidated M.S. & Co. Cassidy	23,987	
Nanoose Wellington Collieries, Wellington	8,624	
Old Wellington (King & Foster)	536	
Total	146,412	146,412

Nicola-Princeton District

Middlesboro Collieries, Middlesboro	6,653	
Fleming Coal Co., Merritt	3,007	
Coalmont Collieries, Coalmont	10,081	
Princeton Coal & Land Co., Princeton	2,064	
Total	21,805	21,805

Crow's Nest Pass District

Crow's Nest Pass Coal Co., Coal Creek	40,898	
Michel	30,879	
Corbin Coal & Coke Co., Corbin	5,645	
Total	77,422	77,422
Total for all Districts		245,639

The Canadian Miners' Buying Directory.

Acetylene Gas:
Canada Carbide Company, Ltd
Prest-O-Lite Co. of Canada, Ltd.
Acetylene Welding:
The Toronto Iron Works, Ltd.
A.C. Units:
Powley & Townsley, Limited.
Agitators:
The Dorr Co.
Can. Chicago Bridge & Iron Co., Ltd.
Horton Steel Works, Limited.
Air Compressors:
Belliss & Morcom, Ltd.
Engineering & Equipment Co., Ltd.
Laurie & Lamb
Sullivan Machinery.
Air Hoists:
Engineering & Equipment Co., Ltd.
Canadian Ingersoll-Rand Co., Ltd.
Mussens, Limited.
Air Receivers:
Engineering & Equipment Co., Ltd.
The Toronto Iron Works, Ltd.
Alloy and Carbon Tool Steel:
Peacock Brothers Limited.
Alternators:
MacGovern & Co.
Aluminium:
Spielman Agencies, Regd
Amalgamators:
Engineering & Equipment Co., Ltd.
Northern Canada Supply Co
Mine and Smelter Supply Co
Wabi Iron Works.
Antimony:
Canada Metal Co.
Antimonial Lead:
Pennsylvania Smelting Co.
Assayers' and Chemists' Supplies:
Dominion Engineering & Inspection Co.
Lymans, Limited
Mine & Smelter Supply Co.
Pennsylvania Smelting Co.
Stanley, W. F. & Co., Ltd.
Ash Conveyors:
Canadian Link-Belt Company
Engineering & Equipment Co., Ltd.
Ashes Handling Machinery:
Canadian Link-Belt Co., Ltd.
Assayers and Chemists:
Milton L. Hersey Co., Ltd.
Campbell & Deyell
Ledoux & Co.
Thos. Heys & Son
C. L. Constant Co.
Asbestos:
Everitt & Co.
Balls:
Hull Iron & Steel Foundries, Ltd
Peacock Brothers Limited.
The Wabi Iron Works.
The Hardinge Conical Mill Co
The William Kennedy & Sons, Ltd.
Ball Mills:
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd
Mine & Smelter Supply.
The Wabi Iron Works.
Babbit Metals:
Canada Metal Co.
Hoyt Metal Co.
Ball Mill Feeders:
Hardinge Conical Mill Co
Hull Iron & Steel Foundries, Ltd
Mine & Smelter Supply.
Ball Mill Linings:
Hardinge Conical Mill Co.
The William Kennedy & Sons, Ltd
Peacock Brothers, Limited
Hull Iron & Steel Foundries, Ltd
Mine & Smelter Supply.
Balances — Assay & Analytical:
Mine & Smelter Supply.
The William Kennedy & Sons, Ltd
Belting—Leather, Rubber and Cotton:
Canadian Link-Belt Co., Ltd.
Northern Canada Supply Co
Jones & Glasco.
Belting:
R. T. Gilman & Co
Gutta Percha & Rubber, Ltd
Belting—Silent Chain:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal.
Jones & Glasco (Regd.)
Belting (Transmission):
Goodyear Tire & Rubber Co
Belting (Elevator):
Goodyear Tire & Rubber Co
Belting (Conveyor):
Goodyear Tire & Rubber Co
Gutta Percha & Rubber, Ltd

Bins and Hoppers:
The Toronto Iron Works, Ltd.
Can. Chicago Bridge & Iron Co., Ltd.
Horton Steel Works, Limited.
Blasting Batteries and Supplies:
Canadian Ingersoll-Rand Co., Ltd
Mussens, Ltd.
Canadian Explosives, Ltd.
Powley & Townsley, Limited.

Bluestone:
The Consolidated Mining & Smelting Co
The Conlagas Reduction Co., Ltd.

Blowers:
Canadian Fairbanks-Morse Co., Ltd
Engineering & Equipment Co., Ltd.
Northern Canada Supply Co.

Boilers:
Canadian Ingersoll-Rand Co., Ltd.
Marsh Engineering Works
R. T. Gilman & Co.
The John Inglis Company
Wabi Iron Works.
The William Kennedy & Sons, Ltd.

Blue Vitriol (Conlagas Red):
Canadian Fairbanks-Morse Co., Ltd.

Bortz and Carbons:
Diamond Drill Carbon Co.

Boxes, Cable Junction:
Standard Underground Cable Co. of Canada, Ltd
Northern Electric Co., Ltd.

Brazilian Rough Diamonds:
Diamond Drill Carbon Co

Brazilian Mica:
Diamond Drill Carbon Co

Buggies, Mine Car (Steel)
Hendrick Manufacturing Co

Brazilian Ballas:
Diamond Drill Carbon Co.

Brazilian Rock Crystal:
Diamond Drill Carbon Co.

Brazilian Tourmalines:
Diamond Drill Carbon Co
Brazilian Aquamarines:
Diamond Drill Carbon Co.
Bridges—Man Trolley and Rope Operated—Material Handling
Canadian Mead-Morrison Co., Limited
Bronze, Manganese, Perforated and Plain:
Hendrick Manufacturing Co.
Buckets:
Canadian Ingersoll-Rand Co., Ltd
Engineering & Equipment Co., Ltd
R. T. Gilman & Co.
Hendrick Manufacturing Co
Canadian Link-Belt Co., Ltd
Marsh Engineering Works
Mussens, Ltd.
MacKinnon Steel Co., Ltd
Northern Canada Supply Co.
The Wabi Iron Works
The William Kennedy & Sons, Ltd
Buckets, Elevator:
Canadian Link-Belt Co., Ltd
Engineering & Equipment Co., Ltd
Hendrick Mfg. Co.
Peacock Brothers Limited.
The William Kennedy & Sons, Ltd.

Cable—Aerial and Underground:
Canada Wire & Cable Co
Northern Canada Supply Co
Standard Underground Cable Co. of Canada, Ltd
Peacock Brothers, Limited

Cableways:
Canadian Mead-Morrison Co., Limited
Engineering & Equipment Co., Ltd
Fraser & Chalmers of Canada, Ltd
Mussens, Ltd
The Wabi Iron Works
R. T. Gilman & Co
Cages:
Canadian Ingersoll-Rand Co., Ltd, Montreal, Que
Engineering & Equipment Co., Ltd
Northern Canada Supply Co
Fraser & Chalmers of Canada, Ltd
The Mine & Smelter Supply Co
Mussens, Ltd.
The Wabi Iron Works
The William Kennedy & Sons, Ltd

Northern Ontario Letter

THE GOLD MINES.

Exploring Goldale.

This week finds the Kerr Lake interests actively engaged in making preparations for an extensive exploration and development campaign on the Goldale property. Harry Kee, manager of the Kerr Lake is in charge of the undertaking, while, as stated last week in the Journal, Messrs. Rudolph L. Wilson & Sons are financing the enterprise. In addition to the excellent possibilities of that part of the property lying east of Pearl Lake, it would appear that special merit also attaches to that part of the holdings which lies adjacent to the Dome Extension side of the Dome Mines.

Porphyry Hill.

An interesting case was taken before Mining Commissioner T. E. Godson, K.C., when the Porphyry Hill property figured in a trial whereby the original owners endeavored to re-establish their title, following forfeiture under a recent Order in Council in regard to non-payment of acreage taxes. At the time of writing no decision has been rendered.

Dome's Income.

The work of preparing the annual statement on the Dome Mines is now in hand, covering the fiscal year ended March 31st. It is understood the report will show an income of something like $2,750,000, during the period under review. Of this total, the income for the last three months is understood to have exceeded $900,000. In view of the ore being exceptionally high grade, it is believed the net profit will amount to at least fifty per cent. of the gross yield, the recent achievement indicating a big surplus over the 10 p.c. dividend requirements and 10 p.c. capital repayment.

Dome Lake.

In regard to the outlook for the Dome Lake and West Dome properties, it has been learned by the Journal correspondent that certain of the principals believe these properties may be successfully operated on the present known ore-bodies. It has been a popular belief that these ore-bodies were too narrow and that the possibilities of making good in a substantial way would rest on the outcome of developments at deeper levels. However, it has been pointed out by officials that the former mining policy was at fault, and that by taking proper precautions against diluting the ore by breaking too wide it will be possible to place the enterprise on a profitable basis.

Schumacher.

At the annual meeting of the Schumacher it was announced that negotiations were pending with regard to either the sale of the controlling block of stock or for raising money with which to resume work. The financial statement contained no surprises, it being shown that the company is without any money, but is not saddled with any serious debts. The outcome of present negotiations will be of importance to the stockholders. There is a general feeling that either the Hollinger or the McIntyre would be justified in acquiring the Schumacher provided the terms were reasonable.

V. N. T.

Arrangements have been completed to resume work on the Porcupine V. N. T. Cold weather has deferred the date of the spring break-up which is to signalize an abundant supply of hydro-electric energy and thus make it possible to get under way at full blast. By the middle of April, the various plants in the Porcupine field will be fully supplied with energy.

Platinum from McArthur.

Assays as high as $41 per ton in platinum are reported to have been obtained from samples brought out by prospectors from the township of McArthur, about 20 miles south of Porcupine. The find was reported last week in the Journal, it being pointed out that the precious metal occurs in pyrrhotite and that the Clifton-Porcupine interests are identified with those who made the discovery.

Blue Quartz Mine.

About 300 feet of lateral work has been done at the 300-ft. level of the Blue Quartz Gold Mines at Painkiller Lake in the Matheson district. This is a consolidation of the former Cartwright Goldfields and La Santa Lucia Mines. The company holds about 500 acres and there are eleven veins which show visible gold at outcrop. At the 100-ft. level the main vein is said to have widened out and carries good values. High grade ore was encountered in the drift last week.

Wright-Hargreaves.

Application has been made to list the Wright-Hargreaves Mines on the Standard Stock Exchange. It will probably be listed before this statement is in print. This company has 2,750,000 issued shares of the par value of $1 each. The mine has operated as practically a closed corporation. The few shares changing hands have recently commanded a price of about $2 each. The company commenced production in May, 1921, and has produced an average of from $60,000 to $70,000 per month since that time. A dividend of 5 p.c. was paid in January and another of 2½ p.c. is to be paid in April.

Kirkland Lake Proprietary.

Once the Kirkland Lake Proprietary completes the present building-up process, the question of carrying on deep exploration by use of a diamond drill will be taken under consideration. This announcement is important for the reason that the Kirkland Lake field has never yet had the advantage of exploration at depth by core drilling.

Lake Shore.

Newspaper estimates of $18,000,000 have been placed on the ore reserves of the Lake Shore "above the 600-ft. level". Such guesses are contrary to the general policy of the Lake Shore and are an exaggeration of the truth. The physical condition of the Lake Shore is exceptionally favorable and there are possibilities of this enterprise being a close second to the McIntyre-Porcupine, which in its last annual statement showed an ore reserve of $6,300,000. It is a pity that exaggerated estimates get into circulation when the management is opposed to such guesses and has adopted a sound and conservative policy.

Highland-Kirkland.

A diamond-drill outfit is now on the Highland-Kirkland property and an extensive campaign of exploration work has been laid out.

King-Kirkland.

The plant on the King-Kirkland will be ready for operation before the end of the current month, according to present progress.

EDITORIAL

Many of us have an abiding faith in the great lone Northland, with its apparently barren and waste stretches of rock and water. The call for its successful development is as compelling as the missionaries' cry which came over from Macedonia. *- A. E. Barlow, 1913.*

WATER POWER, MINING AND METALLURGY

TRUE conservation of our water power resources, which are inexhaustible through use, lies, not in withholding them from development, but in their efficient utilization in the public interest for the economic exploitation of our other natural resources, and for the conservation of our exhaustible fuel supplies." So states, and states truly, the Dominion Water Power Branch in a recent report.

The importance of hydro-electric power in the utilizing of Canada's mineral deposits is not easy to gauge at first glance. It is conceivable that, by virtue of cheap coal, the mining and metallurgical plants of the coast and the interior of British Columbia could be operated economically, though certainly at a disadvantage. But the case of the mines throughout the great Northland of Central Canada, and even in the southern parts of Ontario and Quebec, would be almost hopeless, were it not for hydro electric power. Mining activity in the present centre of Canada's mineral industry would diminish almost to extinction if the water turbines should be permanently disconnected from compressors, stamp batteries, and cyclone mills.

No world progress in metallurgy have a fair chance in Canada without the aid of the electric current. The very big electrolytic plants at Trail, the production of aluminum and of calcium carbide at Shawinigan Falls, and scores of lesser undertakings are directly dependent upon large supplies of electricity at a cheaper rate than can ever be provided by the use of coal. In all our metallurgical plants, cheap hydro electric power is going to emerge, even though in some cases it is not an essential.

How much the development of our Northland depends upon the adequate provision of hydro-electric power, can be gauged from the present difficulties in the Porcupine and Kirkland Lake gold districts of Northern Ontario. Either through mismanagement (which is inexcusable) or through some unavoidable complication as yet unannounced (for which it will be hard to find adequate excuse), the development of unharnessed power on the Abitibi River has been delayed for months. This has already cost the Province a lot of money, through the deferred production of gold that would otherwise have been extracted from the ore, and through the lack of employment to miners and others that would have been available with more power. This refers only to operating mines and mills; how many prospects would have been developed to the producing stage had power been ready for them, it is difficult to say.

It is encouraging to know that at long last, the three claimants to the water-power on the Abitibi River have been brought together in conference. If this results in agreement, well and good; if the three fail to agree, then it is incumbent upon the final authority, the Provincial government, to adjudicate immediately, and relieve the uncertainty of all concerned.

A VIRGIN FIELD FOR PROSPECTORS

The field geologists of the Dominion Geological Survey are pioneers, and their number is all too small to cover the field for which they are responsible. The areal geologists particularly have before them a task, the magnitude of which seems to reduce the human effort to midget dimensions. Still, the work of this handful of pioneers has astonishing results, results that we often fail to recognize or to hold at their true value.

Dr. E. M. Kindle contributes to this issue of the Journal a short description of his journeys last summer in Labrador. It is full of suggestion to the prospector. The Journal is glad to be the medium of such contacts between the pioneer geologist and the pioneer of mining industry.

As Dr. Kindle speaks of Labrador is almost [illegible] to the world. A few [illegible] of the east peninsula have been made hurriedly, by canoe or dog team. None of these routes [illegible] conducive to the discovery of mineral deposits. None have the [illegible] surveys of our government geologists afford of more than a glance at the rock formations. Prospecting routes have been [illegible] knowledge acquired [illegible] prospectors.

The present day field geologist in Canada [illegible] of privacy and to open up to the [illegible]

geology as well as pure geology. Constantly we have instances of the value to prospectors of "tips" from geologists. The chances of a geologist locating an ore deposit are slim; his eyes are concentrated on other features, and he has no time to follow up favourable indications. But his judgment as to the likelihood of finding ore deposits and his advice to the prospector are worth the most serious attention. That Dr. Kindle is ready to recommend Labrador to the attention of prospectors, means more than would appear to the casual reader.

Parts of the Labrador coast are at present rather difficult of access on account of the long intervals between the calls of boats at the scattered fishing villages. But there are regions served regularly by steamers, where supplies are readily available. Given adequate supplies at any one of a hundred points on the coast, the interior is readily accessible by canoe. If mineral deposits of first-class importance were once located, development would be comparatively an easy matter, the present seeming inaccessibility would be wondered at, and the coasts of the peninsula would soon be travelled by prospectors.

A PERFECT BLAST

ON Saturday, April the eighth, there was a demonstration at the trap-rock quarry at Havelock, Peterborough County, Ontario, of a perfect piece of engineering work. Thirty tons of dynamite, distributed in tunnels over the area of an acre, broke 260,000 tons of rock. Not a bit of rock flew over a hundred feet away, and the whole mass was so shattered that only a small fraction of it will need secondary blasting in order to enter a 48 inch by 60 inch crusher.

An instance of engineering work so near perfection as this is worthy of record, and of unqualified commendation. It not only shows the application of professional skill, but is an admirable demonstration of temerity. Few engineers care to risk their reputations on the turn of a switch. If this thirty tons of dynamite had not been skilfully placed, the blast would have been a failure, and a large part of the $35,000 it cost to place the charge would have been wasted. If ten per cent. more dynamite had been used a large part of the rock would have been buried in a swamp, and scattered over fertile fields. If the charge had been ten per cent. smaller, the rock would hardly have been moved, and the blast would have been a failure.

To Mr. George W. Rayner, of Toronto, and to Mr. W. W. Wallace, who assisted him in the field, are due the congratulations of the mining fraternity for a fine bit of work. Both are "hard-rock" men, old in experience, though young in years. It is skill and confidence born of constant and long-continued use that have, in their hands, resulted so fortunately.

La ROSE

THE contest for control of La Rose Consolidated Mines Ltd., Cobalt, is now over and the old board continues in control. A large majority of the shares were voted in favor of President McGibbon's board. Mr. G. C. Bateman, who has been manager since 1916, continues in charge of the mine operations. It may therefore be assumed that exploration will be carried on vigorously.

The contest for control brought out some interesting facts, chief of which was the satisfactory progress made under the present management. Six years ago the old La Rose mine was reported nearly worked out, and the other mines owned by the company were not highly regarded. To explore and develop the ore-bodies necessitated heavy expenditures; but the result of the exploration was to give the mines a new lease of life. A large production has been made, and while costs were necessarily high owing to the smallness of reserves, the company has continued to be profitably operated. Criticism of the management therefore was really criticism of the policy of spending money to find ore. If that policy had not been adopted, La Rose would doubtless have been closed down long ago.

Known ore reserves at Cobalt silver mines have always been small as compared with the annual output. Time and again the life of the mines has been protracted by exploration work. One of the notable successes has been the La Rose since 1916. It is true that La Rose is but a shadow of its former self; but compared with expectations of six years ago, it has since done very well.

There is always room for difference of opinion as to how much a mining company should spend in efforts to find ore. It has been demonstrated however in the case of La Rose that large expenditures were justified. It is pleasing to see that the efforts of Mr. Bateman to keep La Rose on the list of producers are appreciated by the larger part of the shareholders.

"LEST WE FORGET."

In the thick of the Passchendael fight, an Anglo-Canadian and a Canadian were discussing the merits of the Britisher. The conversion wound up with the remark, by the former, that the Englishman is the most merciful man in the world. It is true. The sight to be seen any day there was a "push" showed that it is true also of Canadians. When German prisoners were busy carrying in wounded on stretchers, they joined the long lines of Canadians waiting their turn at the coffee-stalls, and were treated without discrimination by soldiers, padres, and Y. M. C. A. workers.

There is a moral in this.

We Britishers are apt to forget, and to let by-gones be by-gones. This is, for the most part, an admirable characteristic, and bound to stand us in good stead in

the long run. But, in the meantime, it may lead us into doing less than justice to our neighbors.

As in the war, so in the peace, Canadians are far removed from the scene of action. During the wartime we had plentiful reminders of what was going on in France and Flanders, and were inspired to do our bit. The French are still hard pressed, now by economic forces rather than by armed foes; in fact they still bear the brunt, as they did when under arms. We, suffering under no such economic pressure, are more than likely to forget their struggle, and to blame them unduly for their seeming lack of democratic spirit and Christian forbearance. It is easy for us to moralize.

We print today a little reminder of the difficulties under which the French iron miners are working today, as the result of deliberate and well-calculated destruction by the Germans. By a strange coincidence, we received, after this was ready for the press, a request from an eminent French metallurgist that we give publicity in Canada to a book he forwarded giving a full account of the German work of destruction. The French realize the British tendency; let us not forget to remain sympathetic allies.

EDITORIAL NOTES

WE print today, at the top of the editorial page, the prophetic words of a Canadian leader in geological and mining development. He is no longer with us in the flesh, but his spirit and his words remain to help us along in the pioneer work our country needs so urgently.

Each week the Journal will quote the words of some eminent Canadian scientist. We have had a succession of outstanding figures whose memory may well be kept green by this means. A number of our contemporaries have similar attainments, and the Journal will draw upon their inspiration for the benefit of its readers.

The appeal of potential iron ore producers in Ontario for a bounty is still before the public. The public and their official representatives have so far proved apathetic, or even hostile to the proposed bounty. We believe that the end fully justifies the means in this case.

It is a pity that there has been no concerted action in bringing this important question to the notice of the public and of our legislators. There are a considerable number of furnace operators, owners of iron ore deposits and others that will benefit directly from the efforts of the Algoma Steel Corporation, if they are successful. The officers of this company have always been pioneers and they deserve more support than the public at present accords them. There are some items of information on the case on another page.

In the issue of March 24th, we expressed some doubt as to the "financing" upon which is based the new attempt to open up the old Laurentian Mine in Northwestern Ontario. Col. H. A. C. Mackin, of Kenora, who has undertaken the venture, has set this doubt at rest. Col. Mackin has raised money for the new work on terms that are very reasonable at this time. This money, wisely expended, will, we hope, act as beefsteak to the "black eye" from which Northwestern Ontario at present suffers.

An interesting feature of recent operations at the Nipissing mine is the result of exploration at shaft 63. A drift at the second level along a new vein opened up 70 ft. of ore averaging 3,500 ounces silver per ton. This sort of thing was common enough at Cobalt ten or fifteen years ago, but it is a notable discovery now.

Commenting recently on proposed Blue Sky legislation, Mr. R. Home Smith contends that there is no need of it. He considers as unfair the adverse statements made about mining enterprises, and contends that there is no more fraud in mining in Ontario than in other business enterprises. He believes that Toronto business men will be pleased if the attempts to saddle business with Blue Sky legislation fail. Honest enterprise, real endeavor to make mines, should not be handicapped by experimental legislation.

OLD TIMER

(Twenty-odd odd years ago there happened an incident in North-western Ontario on which is based this otherwise inexcusable rhyme.)

The Boss, he put it over me;
He knows I ain't so limber
As what before I used to be
But I can handle timber!

I'll cut a hitch with any man
I'll set my stulls, or lagg'em
As well as any youngster can
But I can't stand no naggin'.

The Boss, he heard some talk of mine
How I'd been never tired
So he just up he sez sez he
Have you done as required?

I don't let no man talk to me
And I don't care a dime,
So I just sez, quite carelessly
Boss, please give me my time.

So I ain't got my sackin' (oil),
And I don't need it either;
Because I know my job from hell
And I'm not jokin' neither.

VANOX

Some Labrador Possibilities*

By E. M. KINDLE

THE mission which took the writer to Labrador last summer gave relatively little opportunity to investigate the economic possibilities of the country. But it is not easy for any geologists who has for a season felt the spell of this vast and very slightly explored land to avoid suggesting to mining geologists that there are reasons for believing Labrador will eventually contribute to the world's supply of mineral wealth.

The Labrador peninsula is nearly as big as Alaska and it is in about the same stage of economic development which had been reached by that other great peninsula when Russia sold it to the United States, as a supposedly worthless possession, for seven and one-half million dollars. Until very recently Canada has taken little more interest in Labrador than Russia took in Alaska. This is indicated by the fact that the boundary between Newfoundland Labrador and Canadian Labrador has never been even approximately agreed upon. The maps published by standard atlases differ as much as 300 miles as to the location of the boundary between Newfoundland and Canadian Labrador in the Lake Melville region. Labrador still belongs exclusively to the cod fishermen and the fur-traders.

John Cabot's announcement on his return to Europe from the Labrador coast in 1497 in that the shoals of were so numerous that "they sumtymes stayed his ships" resulted in all the countries of western Europe sending fishermen to the new fishing grounds which have been exploited with abundant success to the present day.

Neither the fishermen nor the fur-traders who followed them have ever sought to develop any other wealth in Labrador beyond that furnished by the cod and the pelts. They have, however, given a few hints to the prospector which have thus far remained unheeded.

Copper

As early as 1840 a chunk of native copper was found on the shore of Hamilton Inlet not far from the point from which the writer's recent expedition into the interior set out. The first hints of the existence of the famous Michigan copper district came from the farmers of the Central State who picked up pieces of native copper in their fields long before the location of their source was known. In the Lake Melville district there are various half-breed trappers (the Liveyers) who have specimens of calcocite and other copper ores which they found near trap lines. In one or two cases known to the writer patents on mining property have been taken out by these trapper-prospectors from the Newfoundland Government where the finds lie almost certainly in territory which will eventually be shown to belong to Canada. Bell was shown specimens of these copper ores in 1882 (Can. Geol. Survey, 1882-1884, pp. 12-13D), but no serious attempt to investigate their comercial possibilities appears to have been made.

Gold

Placer gold of commercial value may never be discovered in Labrador but if it should be found in the sand and gravel terraces which run inland for hundreds of miles along the lakes and rivers west of Hamilton Inlet the water supply furnished by hanging valleys would afford numerous opportunities for hydraulicking on a mammoth scale.

Keewatin (?) Rocks

The discovery by Coleman in Northeastern Labrador of rocks provisionally reported as Keewatin in Mem. 124 of the Geol. Surv. Can., is another hint which the mining geologist may do well to take note of. If a series of rocks which has proven so richly productive in minerals in Ontario is present in Labrador their careful prospecting in this region would seem to be fully justified.

Water Power

The writer has recorded elsewhere his impressions regarding the forest resources of the Lake Melville district(1). When the pulp wood industry is developed in eastern Labrador as it certainly will be eventually some of the abundant water power of the country will no doubt begin to be utilized. The Hamilton river, a stream at least the size of the Ottawa river at Ottawa, has two falls with a combined drop of 70 feet within twenty-five miles of Lake Melville, which is navigable by sea-going vessels. A half dozen other streams entering this lake descend in the comrse of a few miles 1000 feet or more and offer water power possibilities which would be utilized immediately if they were on the opposite side of the Atlantic.

Grand Falls, which is one of the great waterfalls of Canada, is located about 250 miles above the mouth of the Hamilton river. The river here makes a total descent of 760 feet in twelve miles, terminating wtih a singe plunge of 302 feet. Acecording to Low the roar of this fall can be heard for more than ten miles and the "cloud of mist is visible from any eminence within a radius of twenty miles."

Interior Explorations

The exploratory surveys of the Canadian Geological Survey conducted by Low in the peninsula show that iron ore exists in various parts. The two traverses carried across the great peninsula by Low demonstrated also the possibility of exploring and mapping a great part of the interior with the aid of canoes,—the only means by which the interior could then be reached.

The use of the aeroplane should soon inaugurate a new era in the exploration of the interior. The thousands of lakes which are scattered throughout the peninsula furnish peculiarly favourable conditions for the use of the hydroplane in Labrador.

Prospecting

The mining engineer may be reminded that while the Labrador coast line was the first part of North America to be seen by Europeans most of the interior is still practically an undiscovered country. It is a country which can be recommended to the prospector who has the skill to combine trapping with prospecting. The men who can do this have the certainty of a living from their traps and a fair chance of proving that old Jacques Cartier was slandering the country when he called it the "Land that God gave to Cain."

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* Published with the permission of the Director of the Geological Survey, Ottawa.

(1) Can. Forestry Mag., April, 1922.

What One Iron Mine Means to Canada

By GEORGE S. COWIE.

(Abstracted.)

No nation has made much progress industrially until it has mastered its iron and steel problem. Canada in the past decade has to a great extent improved its situation as regards its iron and steel products, but the supply of the base raw material (iron ore) entering into the production of iron and steel products has today fallen to the point where not a pound of iron ore is being mined at any point in Canada.

High Cost of Beneficiation

Now that the known merchantable iron ore bodies are exhausted, the next step naturally would be to undertake the problem of supplying to the furnaces Canadian ore from our known low grade deposits, thus opening up our natural resources. It has been proven after very costly experiments that our low grade ores can be successfully treated and made an ideal ore for blast furnace users, but the cost of treating, or beneficiation, is so great that foreign ores can be laid down cheaper, and for that reason the Magpie mine in the Michipicoten district and the Moose Mountain mine in the Sudbury district are both shut down with no prospects of reopening.

What Magpie Closing Meant

Now what does it mean to have a mine the size of the Magpie shut down? We find that during the years 1916 to 1920 almost $2,000,000 was spent for supplies. About $500,000 of this was spent in the Soo and the balance in old Ontario, Quebec and the United States. In addition $633,000, was paid for freight on the movement of the ore produced, $217,000 for freight charges on coal. Other items were sundry freight $140,000, duty $60,000, power $19,000, while wages amounted to $1,650,000, or a total for supplies, freight and labor of $5,000,000, an average of $1,000,000 per year. If the Magpie Mine were in operation this year see what relief it would have afforded to the unemployment prevailing not to take into account the benefit of the circulation of the $1,000,000.

Expenditure for Farm Products

During the five year period mentioned before, we find there was spent in the Soo for farm products for the Magpie Mine, the following amounts:

Vegetables and fruits	$ 38,000
Meats	152,000
Flour and feed	54,000
Butter and eggs	48,000
Total	$292,000

If the iron ore mines in the Michipicoten district were opened up on a large scale the amount of such purchases would be trebled.

Every year you find in the government estimates large sums for the direct benefit of the farming and other industries, but you do not see any amounts set aside to encourage or assist the iron ore industry. I think the government should very carefully consider this very important phase of mining and this year grant such assistance as is necessary to allow the mines to reopen.

Request for Government Aid

The Federal government at Ottawa and the Provincial government at Toronto are going to be asked to jointly bear the expense of the necessary temporary assistance asked for, this assistance to extend over a period of 15 years. Such assistance would have the almost immediate effect of developing ore properties in various parts of the country and especially in the Province of Ontario which possesses probably 80 per cent. of the known low grade ore deposits. Those seeking the assistance show their good faith and are content that such assistance should be payable only after the ore has been actually treated and ready for the market. Further, that private capital takes all the risk of success or failure, establishes the industry and produces its product before calling upon the governments for any payments.

Why should the request for assistance be granted?

1. Every dollar is spent for labor. There is no natural increase as on a farm. Every dollar is paid out to Canadian workmen.

2. The rapid development of natural resources is the only means of meeting the financial obligations of the war.

3. The nationalized railways must be made to pay their way. Mine products are the largest single source of railway traffic and iron ore produces a larger volume of this traffic than any other mine product.

4. Established raw material supply of any commodity is a vital national necessity.

5. Abundant deposits of low grade ores are accessible to existing railway lines.

6. The granting of assistance would involve a small annual outlay but the large returns and impetus to industrial activity would be immeasurable.

7. As no iron ore mines are now in operation the payments to mine owners during the first two years would be very small. The amount payable thereafter, depending as it does on iron ore actually mined and beneficiated, will simply be a measure of the growth of the industry; the larger the growth and expansion the larger will be the benefit to the country generally.

8. The retention in Canada of large amounts of money now being sent out for the purchase of foreign ores, and on the other hand the employment and investment of foreign capital to help the mines.

9. Expansion of the agricultural industry on lands tributary to the mining and smelting centres, larger markets for the farmer and increased consumption of manufactured articles.

10. Last, but not least the production of Canadian iron ores will complete the national equipment for the production of iron and steel as wholly a Canadian product, with the exception of the coal used, place Canada in a position of greater independence and assure the blast furnace and steel works a home product which, at any future time of stress, will enable Canada to carry on, within the confines of her own country, the complete production of iron and steel.

Iron Mines in the Briey Region, France, Damaged during German occupation, and their Reconstruction

Abstract of paper by A. Guillain (Paris), in Journal of the Iron and Steel Institute

At the time of the declaration of war by Germany, eighteen mines were in operation and a new one was being opened in the Briey field. In the Longwy field fifteen mines and three quarries were working. In 1913 the production of Briey was 15 million tons and that of Longwy three million tons. The mines gave employment to about 15,000 workmen, mostly Italians. The total population dependent upon the mining industry was about 40,000. These people were housed in workmen's colonies built by the mine owners.

The distance from Briey to Metz is 20 kilometres. The town of Briey and all the mines between Briey and the frontier were under the guns of Metz. Within a few days after the declaration of war the whole of the Briey region was effectively occupied by the Germans. In the course of brief fighting three mines were drowned out. Otherwise no further fighting occured in the mining region, and the Germans could work the mines at their leisure or destroy them.

The German government then proceeded to demolish completely or to transport to Germany all the steel plants. The majority of the blast-furnaces were preserved and shut down. Most of the mines were kept working, and the ore was sent to Germany until, the fortunes of war having changed, they were closed down, and most of the material and stocks carried off.

That the destruction of the iron mines was not completed, as it was in the case of the coal mines of the North, was due only to the fact that the precipitate retreat left them no time.

German Organization for Working the Mines

German organization began in October, 1914. The first care of the central administration established at Metz was to transport to Germany all stocks of iron ore from both fields. These amounted to 1,400,000 tons. Prisoners of war were drafted for work in the mines. They were harshly treated and badly fed.

During the first year, 1914-15, only a few mines were worked, the production amounting to about 1,000,000 tons. From other mines much surface and undergound equipment was carried off. From 1916 onwards, the working of the Briey mines was intensified, and some mines already partly stripped were re-equipped. In that year ten mines yielded about 2,600,000 tons. In 1917, the output reached 5,200,000 tons, but, owing to scarcity of labour, the tonnage in 1918 was only 4,400,000 tons.

Pillaging of the mines was continued. During the whole of the four years of war operation the output amounted to only 13,300,000 tons, although it had exceeded 18,000,000 tons per year before the war. Because the only object of the Germans was to intensify production, the mines were found to be in a deplorable condition when the French owners returned in November, 1918.

Estimation of Damages

The estimates of damages were made under the control of the Ministry of Mines of the State.

The sum total of the damage at the mines of Briey and Longwy, agreed on by the Ministry of Mines and the owners, amounted to 429,465,000 francs as direct loss and 120,000,000 francs as damages for reconstruction and loss of revenue throughout the period of resumption of work.

Results Achieved in Repairing the Mines

The work of repair was begun immediately after

Steel Plant at Longwy.

Shaft and Shaft-house Destroyed.

Rolling Mill of the Longwy Steel Plant.

the Armistice, under extraordinary difficulties. The orginal mine staffs were totally disorganized. The country was occupied by American troops until April, 1919, and the railway capacity was entirely absorbed by military transport. In spite of this the dwellings were gradually put in order and equipment and machinery repaired and replaced. All plans, drawings and correspondence had been removed or destroyed, and all haulage and transmission lines removed. To remedy this, the mining and smelting companies formed a joint purchasing association, which was, through another central body, commissioned to buy all necessary material.

Owing to the bad faith of the Germans, however, the sums necessary for reparation had to be advanced by the mining companies from loans contracted in France. Government assistance had been checked by want of cash, and the work of reparation to some extent stopped.

However, the actual expenditure of the companies on the mines, partly met by the French State, amounted at July 1st., 1921, to about 150 million francs. On account of the increase in cost of working and the extra pumping necessary, it is certain that the mines will never be completely indemnified. Moreover, the companies find themselves obliged to seek new workmen in France and particularly in Italy, and to train these afresh.

Nevertheless, within a year of the recovery of the mines by their owners, about 5,000 workmen had been recruited as compared with 15,000 before the war. At the end of 1920 the workmen numbered about one-half the pre-war establishment, and the houses were by this time almost entirely rebuilt or repaired.

Progress made is indicated by the fact that the output for December, 1918, was nil; for January, 1919, 14,000 tons; and for January, 1921, 500,000 tons. This is slightly greater than one-third of the pre-war tonnage.

This tonnage has been mined and marketed in spite of the destruction of plants, dispersal of labour and the cessation of all relations with clients for four years. Amongst other new trade developments, without doubt important quantities of ore will be exported to England.

The following is of historic interest. It is an exact translation of an official German document found at the Anderv mine after the German retreat:—

TRANSLATION OF A GERMAN DOCUMENT

July 4, 1917.

Destruction of the Anderny Mine in case of a break-through on the front.

To the Imperial Administrator of Mines, Homécourt. Division A

Attached hereto we submit to you a statement showing the time and number of workmen necessary for the destruction of the mine of Anderny in case of a break-through on the front.

Directorate of the Anderny Mine
(Sined) Joesten

SECRET

Anderny Mine, July 4, 1917.

Statement of the work necessary for the destruction of the mine of Anderny in the case of a break-through on the front, and the wagons required for the removal of the more important material.

1.—Destruction requiring three-quarters of a year to make good.

Removal of pumps.

Blocking of shafts Nos. 1 and 2 by throwing in the cages and tubs after cutting the cables.

Destruction of the pulleys and the winding engines.

2.—Destruction requiring one and one-half years to make good.

As above.

In addition, to blow up the whole winding plant, engine house, foundations of the winding engine, and the stock bins.

3.—Permanent destruction.

As in No. 2. In addition, destruction by dynamite of the shaft lining. To blow up completely the head-gear, stock-bins, to burn the wood tower at shaft No. 2.

For the first case 10 men are required, time 24 hours.

For the second case 20 men are required, time 36 hours

For the third case 32 men are required, time 60 hours.

Twenty-five wagons will be required for the transport of the material, without counting those which would be necessary to remove the coal and ore, of which the quantity will be fixed according to the demands.

Anderny Mine. Director (Sgd.) Jessten.

CANADIAN GEOLOGIST HONOURED

Dr. Charles Camsell, Deputy Minister of Mines, has been honoured by the Royal Geographical Society of Great Britain, which has awarded him the Murchison grant. The Murchison grant, which is valued at £40, is given for distinguished service in exploration. Dr. Camsell has been selected to receive the grant for his explorations and surveys in northern Canada. The award will be presented at the anniversary meeting of the Royal Geographical Society in London in May. Before being appointed Deputy Minister of Mines in 1920, Dr. Camsell was geologist on the staff of the Geological Survey and carried out most valuable surveys in the unexplored north and in British Columbia. He was born in the Mackenzie basin, being the son of a Hudson Bay factor. He is a vice-president of the Canadian Institute of Mining and Metallurgy.

TITANIUM PAINTS

Of considerable interest to Canadians is the announcement by the National Lead Co., made some time ago, and quoted by Frank L. Hess in his annual summary of "Mineral Resources of the United States," that titanium paints are now a commodity on the market. We have huge deposits of ores of titanium in Canada, which have never been of much use, and are not even explored on the surface. Following is the statement:

"The National Lead Co., after a year's investigation, in January, 1921, exercised its option to acquire one-half of the outstanding capital stock of the Titanium Pigment Co. (Inc.), having a plant at Niagara Falls, N. Y., engaged in the manufacture of titanium oxide pigment, which it sells under the registered trade name 'titanox'.

"Titanium is a metal widely distributed throughout the earth, but is found in a form relatively easy of treatment in mines controlled by the company near Jacksonville, Fla. This is a new white pigment. It is very interesting in that it has twice the hiding power of pure white lead. Before the National Lead Co. exercised its option it assisted in negotiating a settlement of conflicting patent claims, by the terms of which the Titanium Pigment Co. became the owner of all patent rights in the United States previously owned by the Titan Co., of Norway. Where great hiding power without increase in weight is desired, this pigment should prove to be very valuable. Its cost of manufacture is still high, but it is hoped that, with increased tonnage and improved manufacturing methods, this pigment will soon take its place amongst the best and most marketable white pigments."

News and Comments

By ALEXANDER GRAY

"Are We Downhearted?"

AT this writing it looks as if the Nipissing company will pass up the Rochester Veteran Claim at Porcupine. That will be disappointing to those who appreciate what it would mean to have the premier silver mining corporation of Canada take part in the premier gold-field of Canada. It is not to be understood, however, that the decision of Nipissing engineers, if in the negative, is equivalent to a condemnation of the property. Drilling results were encouraging. For an ordinary undertaking they might be considered satisfactory; but they do not appear to have sufficed for Nipissing purposes. Nipissing has had another try for something suitable for the reinvestment of part of its surplus capital. Previous efforts of the sort had been made. No doubt, as Mr. Earle intimated, the quest will be continued, for Nipissing methods are worth a permanent place in Canada.

For an individual deposit of adequate size, Nipissing has all the working capital necessary. It is stronger in this respect than La Rose company was when President McGibbon took an interest in the Canadian Mining and Exploration Company. On that venture and his experiences while awaiting the finding of mines or properties that would be likely to become mines, Mr. McGibbon last week addressed La Rose shareholders, according to the daily press reports:

"The president told how a Canadian Mining and Exploration Company with five millions capital of which two and a half had been subscribed with the shares at $5,000 each had been formed to examine properties and mines and had examined over 2,000 looking for something in which they would put in their capital and in which La Rose Company could invest its surplus, but they had decided that it was almost hopeless to find any thing and the company was wound up. The company then engaged G. C. Bateman, who was the engineer of that company as their general manager and he had absolute unbounded 100 per cent confidence in his intergrity and ability as an engineer."

To most mining men there is a meaning in this, and a moral which Mr. McGibbon did not point out. He explained that La Rose management continues to be diligent in "looking round for properties", consequently there must be conservation of the cash surplus "for the purpose of investment rather than to pay dividends". Had the occasion been opportune, though, there might have been discussion as to why 2,000 examinations had resulted in wholesale rejections. Mr. McGibbon certainly is a Canadian Mining & Exploration shareholder, and the understanding was that La Rose Company would have a call upon any desirable underwriting. But neither the Nipissing nor the Canadian Mining & Exploration Company could find anything "big enough," ready made mines and imposing prospects not being plentiful.

Probably the mining and exploration venture referred to by Mr. McGibbon had more capital behind it than any other organization of the sort in ancient or modern times. Its foster parent, the late Ambrose Monell, enlisted Canadian and American capitalists who could underwrite a large slice of the universe. No idealistic optimist could have been more buoyant than he on that morning when, over a cup of coffee he babbled enthusiasm and declaimed about the likelihood of finding "another Utah, or Inspiration, or Creighton Mine". Exhibiting a telegram from a close friend asking that he and his father be "put down for a million dollars", Mr. Monell was serene.

The Consulting Engineer retained was, and is, an imperturbable, hard and fast rule man with a sense of responsibility to capital, not averse to taking a chance, but indisposed to entertain what would not defray the cost of a week-end house party to most of his principals. It was the combination of capitalists, in reality, the formidable character of it, that precluded the exploration company from taking on practically every one of the two thousand or so propositions examined. Therefore, Mr. McGibbon inadvertently erred when he inferred that not one of the two thousand was worth taking up—for that would be a reflection on Canadian mineral areas. The Surf Inlet property was subsequently purchased and brought to the producing stage by the Tonopah Belmont people. The Premier property in the Portland Canal district was abandoned before the war, and subsequently proved by the Messrs Guggenheim to be the greatest precious metal mine thus far discovered in the Pacific Coastal region. Complications prevented the acquisition of the Engineer Mine. It is unnecessary to detail the properties which the exploration company might have tested and invested in; but no ordinary mine would suffice for super-capitalists to whom petty cash dividends would not pay for the cigars. The exploration company was so strong, it was weak when it came to the commonplace property. This was not the fault of the technical staff, nor is the country to blame.

Since the exploration company surrendered its charter, and while other influential mining corporations have been in the market for properties, as Mr. McGibbon stated, producing mines of those pre war days are larger producers; Porcupine, Kirkland Lake, Portland Canal and other fields have asserted themselves. So, if the opulent are hard to please well, there are others! Instead of being down hearted, there is a surplus of optimism. Mr McGibbon and his deservedly "100 per cent" General Manager can hitch a portion of their surplus to some star proposition and bring more cheer to La Rose shareholders.

Canada has had its bumps, but there are more fish in the sea than ever were caught and some of them are whales.

"C.P.R." Interests in Mineral Industries

Modesty! Thy name should be Beatty Ogden.

No other conclusion is possible by those that read "Exhibit D" in the Annual Report of the Canadian Pacific Railway and Appendices. It is so captivating it must be hyphenated, as it combines the retiring dispositions of the President and the veteran Financier whose habitual understatements are so [illegible] ment" only in amorous language can we express it. Biographers or obituary writers could not ignore the characteristics of Messrs. Beatty and Ogden for the proof is matter of public record in the [illegible] hibit D". There, also, is partial [illegible]

George's sophism that there is such a thing as unearned increment.

The Canadian Pacific Coal Lands situated in Alberta are taken into the statistical glossary at $1. Another parcel of land (46,933 acres) in British Columbia is valued at $10 per acre. This is a concession to optimists. Natural Gas rights in 1,000,000 acres sold and rented are estimated at $1, notwithstanding the revenue therefrom for the year ended December 31st. last, was $254,524.49. Besides there are 50,000 Alberta acres in which the petroleum rights have been retained the surface rights being sold or unsold, the petroleum rights to be developed on a royalty basis. This 50,000 acres is valued at $1. Is it any wonder the sum of $12,719.89 was "applied in reduction of the cost of mining and other property?" All things mining-wise have to be prudently handled. But in one particular the Beatty-Ogden modesty erred. They carried the 177,025 shares of Canadian Consolidated Mining & Smelting stock, at $4,425,625, or $25 per share, which is above the market. Canadian Pacific, however, owns 42 per cent of the total stock issue, as well as $2,698,400 of the $3,000,000, 7 per cent Convertible Bonds. Thus it is evident that the railway company has $7,124,025 in "Smelters" that is not valued at $1.

Mr. Tyrrell Admonishes London.

Being the Archdeacon of his profession, as it were, Mr. J. B. Tyrrell wrote to a London newspaper that migratory persons might go over there and offer "new discoveries" that are not such. In the absence of perjury as to *bona fide* discoveries having been required at this end, (the Ontario Mining Law no longer requiring this) it is not incredible that Mr. Tyrrell is an apostle preparing the way for a fuller appreciation by London that it should not "entertain angels unawares", without their being properly introduced. Unfortunately London does not always give heed to representative Canadian spokesmen.

Asbestos Industry and Fordney Tariff.

Quebec Asbestos producers and the Canadian Manufacturers Association are not going to submit tamely to the Fordney Tariff restrictions in the form of a duty of 3½ cents per square foot, plus 10 per cent. ad valorum on colored asbestos shingles, the Canadian make selling at $5 per hundred feet. Nor will they forego reprisals if other Fordney bill features are enacted. Whether a retaliatory export tax on raw asbestos will be imposed has yet to be determined; but Canada is a 'weary of what Washington thinks about appropriating Canadian natural resources. Fordney schedules may disconcert the Asbestos Industry in Canada; there is some Asbestos in the States — but there will be more asbestos manufacturing concerns on this side of the border when the controversy is further along.

Real Forward Movement Under Way.

Opportunity to obtain an insight into business developments in the States was availed of last week. The [illegible] was in such striking contrast of the blue ruin atmosphere in which metropolitan offices have been enshrouded, that a reason for it was sought. It was provided in private reports by keen observers in close contact with the largest steel and equipment plants. Almost without exception the reports bespoke the elimination of pessimism and restoration of confidence. Railroad buying, purchasing of structural materials, doings of rolling mills, reflect such a decided change of front that some of the more conservative leaders almost doubt whether the movement is not too aggressive. But business is being booked, and that is concrete evidence. Automobile plants are at or almost at capacity. The National Tube works have joined the procession. It is noteworthy that in various instances concerns that did not intend or expect to start during this year are going to open in the near future. Prices may have to be reduced, but the percentage of production is on the ascending scale, and the optimist is having his innings. Export business, it is admitted, is nothing to boast of. That awaits international equilibrium, that may be hastened by the Genoa Conference. Internal troubles like the present coal strike are secondary, because foresight was exercised and plants are supplied for months ahead.

Money for Kirkland Lake Country.

Capitalists and Mining Engineers representing very influential New York interests are examining carefully the Kirkland Lake district areas immediately east of the Tough Oakes and further along into Gauthier Township. They are doing what their training dictates; basing their plans upon underground developments at the producing properties, and the geological conditions wherever favorable. If values are found on the surface, so much the better. The men and their methods are a guarantee that they know their way about and are not "bearing" Lebel Township.

American Zinc Producers.

Periodically Canadian producers of zinc flatter themselves that they can produce the metal as cheap as their competitors. The Consolidated Mining & Smelting Company proved it could make and market zinc at a profit when others remained shut down or slowed down. So far, so good. But should the proposed Washington tariff be enacted and India and Australia return to zinc production on a large scale, what is Canada doing to maintain and increase its zinc output, apart from Trail operations? Either Canada must accept restrictions, or producers must supply more finished products. For some time, American Zinc Producers through organizations created for the purpose have been working to extend the uses of the metal. It is calculated that two-thirds of their zinc goes into galvanized iron. The present consumption for this purpose is about 50 per cent. Automobile tires are taking more and more zinc oxide. A new line has been developed in zinc shingles; really galvanized shingles. Are we to be content with sheets, discourage research, retain our scientists on a starvation wage, and await results from Washington, Pittsburg, and St. Louis?

Enterprise in Lignite

While Ottawa is debating whether or not its official scientists are so many unnecessary evils, a combination of St. Paul, Minneapolis and Des Moines capitalists has undertaken to exploit "immense lignite fields in North Dakota". A St. Paul chemist, Carl Jaeger, is heading the project, and eight thousand square miles of lignites will be "utilized", the idea being to provide "fuel in the form of pressed briquettes, lubricating oils, dyes, benzine, perfumes, carbolic acid, paraffine and various other chemicals". The prospectus and diversity of products is attractive, and the more interesting because Canada has so many square miles of lignites. It is possible we Canadians may get beyond the experimental stage and avoid the importation of what North Dakota expects to offer.

WHERE IS J. N. T. GRAY?

A letter to J. N. T. Gray, addressed c/o Humboldt Smelting Co., Humboldt, Arizona, from South Africa, has been forwarded to the Canadian Mining Journal by request of the writer. We shall be glad to hear of Mr. Gray, in order to forward the letter.

Notes From Nova Scotia

The "Strike on the Job" Finished

With the reconvening of the Gillen Conciliation Board the United Mine Workers called off the policy of "striking on the job." They justified their action by stating that they had accomplished what they had aimed at. If they have succeeded in doing any one thing, it is to show their weakness with their members, for only a very few collieries were affected and those few not seriously, by the lowered production orders sent out to the different locals. Absolutely no response was made by the miners of Cumberland County, and the output remained normal.

In the meantime the miners of Springhill went on with the recommendation of the Gillen Board and settled the machine rates. Springhill collieries since the seventies have been worked by hand picks, but the Empire Steel Company decided to put in the "Radial" cutting machines. These were found to be successful but it was found difficult to fix a rate for undercutting and the matter went over to the Gillen Board with the above-reported success.

The Pictou Collieries like Springhill took no notice of the orders from the U. M. W. of A. headquarters to reduce outputs, and went on as usual. Indeed one of the Locals refused to discuss the matter, and although a whirl-wind campaign was put on by the fiery secretary, all wheels turned as usual.

Record Output at Sydney Mines

The March output of 63,000 tons at Sydney Mines was the largest in the history of these collieries. In spite of all the efforts of U. M. W. of A. officers, local contract rates were renewed in all collieries with the exception of Florence, where the roadmakers failed to come to any settlement. The policy of the Empire Steel Company has been to place as many of the different classes of datal men on contract work as they possibly can. These men are offered favorable rates, which are an incentive to maximum efficiency and high wages. The result at Sydney Mines up to the present has been highly pleasing both to the Company and the men, and in addition to good wages, a better feeling has been created, which means much for the progress and welfare of the town. That such agreements on local contract rates can take place at a time when the whole district is thought by outsiders to be seething with ferment bordering on revolution, speaks most highly for the management in charge at the collieries.

Glace Bay Output

In the Glace Bay District the output for March was well over 200,000 tons. As there was much broken time due to adverse trade conditions, it will be seen that the "Strike on the job" policy was a failure. Very little effort was made by the Company to meet this pernicious method until all negociations looking to a settlement with their employees, broke down. It did not take long however to bring some of the worst mines into line when a definite line of action was agreed upon. Men were requested by the mine officials to send up a normal day's output and were warned that failure to do this would result in their being sent out of the mine or transferred to sections giving low outputs. Day men employed in the sections found idle were sent out of the mine. In this way the cost of operating was kept down, the tonnage of bad sections was kept up and the output of the mines made to correspond to the number of men employed. Probably no weapon of retaliation was ever used by an organized body with less success, and we are certain that none was ever so much hated and despised by miners and their wives. It is said that "Soldiers swore in Flanders" but there were more than soldiers using fierce oaths on Saturday when empty pay envelopes were opened and silly miners had to admit they could earn more but that they were afraid to be "bawled out" by their fellow-workmen. But fear fled before the crying need of families, and one after another of the Miners' Committees met and agreed with the Management that they would do a full day's work. And when the order went forth revoking the low production policy there were few to hear it for it had been fully demonstrated that the weapon used was two edged and more dangerous to the user than to the opponent.

New Development Work Awaiting Stable Conditions

A large program of development awaits a settlement of the wage dispute at the collieries of Nova Scotia. In the Cape Breton district alone many hundreds of men would be able to find employment. New slopes would be put down and new collieries equipped with up-to-date plants.

At some of the older colliery centres which have long leases of life ahead, electrification of power would be made and all other departments modernized. The Dominion collieries are kept well to the front and all mechanical devices and machinery which make for efficiency and safety are sought out and installed.

Eminent Engineers Employed

Eminent mining engineers expert in under sea mining have been brought from Britain to advise in working the extensive submarine areas of Cape Breton. Their knowledge and experience as applied to all undersea collieries of the Island has been of immense value. From the result of an inspection by one of these last fall, No. 9 colliery Glace Bay has been found to have a seam, known as the "Harbor" overlies the Phalen seam, which is operated by No. 2 Mine. As the coal faces of both collieries were almost one above the other, it was decided that the lower seam should be advanced. This is being done and No. 2 colliery has been placed on double shift to maintain the output of No. 9 Colliery.

About the time that the Empire Steel Company was taking shape expert Mechanical Engineers were brought in from the United States to advise as to changes in machinery. The future had great things in store for Nova Scotia collieries.

Undercutting machines are used. They are now adapted to the different coal seams. Increased tonnage, low costs and safety are all factors governing the kind of machine used.

British Columbia Letter

THE SPELTER CONTRACT

A recent debate in the Imperial House of Commons, disclosing that Great Britain is under contract up to 1930 to purchase large quantities of spelter from Australian producers at a price ranging from £1 to £10 per ton, transport extra, has created much comment in British Columbia.

Within the past few years the Consolidated Mining & Smelting Company of Canada has become a very substantial producer of spelter, its Sullivan Mine ore carrying zinc values and the plant at Trail B. C. having been brought to the point metallurgically that permits an economical reduction of the ore and the shipment of the spelter at a cost that gives assurance of at least a fair chance of successful competition in the open market.

The electrolytic plant of the Trail Smelter was installed during the war. It then was an experiment to a large extent. The cost of the undertaking was heavy. The need of the product at that time was imperative and the Company did not hesitate in taking the chances involved. The result was a considerable output of zinc which was sold at prices below those obtaining elsewhere. There is no doubt that the Company did the country a service in the bold adoption of this policy and in fearlessly carrying it to an issue at that time. Research work has been going on constantly which only recently has had its reward in bringing methods of treatment, particularly with regard to the ores of the Sullivan Mine, to that stage of perfection beyond which it can scarcely be expected to go. Coincident with this announcement comes the statement that an additional plant is to be provided for the handling of custom zinc-bearing ore of the Kootenays. The benefits, therefore, are to accrue not to the Company alone but to many of the independent operators of eastern British Columbia. With local conditions brighter than they have been for many months the realization that the market of Great Britain, and through Britain possibly a considerable part of that of continental Europe, is tied up, is viewed with some alarm in mining circles of this Province.

Criticism is met with, not only from officials of the Company affected, nor alone from mining interests directly and indirectly concerned, but from the general public. One of the Vancouver City daily papers "The Daily World", after referring to the British Government's undertaking to purchase 45,000 tons of refined spelter annually for ten years from the Electrolytic Zinc Company of Australia at a considerable premium above the present price of the metal, asks: "How is the purchase of this huge quantity of zinc—nearly double the amount that Trail turned out last year—going to affect the zinc market? It is hardly conceivable that it will have other than an injurious effect. If so the further question arises is it quite fair to the Trail plant, that has borne the burden of developing the electrolytic zinc process during the stress of war, and that sold zinc to the British government during the war at a price that sometimes was as much as ten cents per pound below the price that was being paid for the metal in the United States? If the British Government is disposed to confer favors to zinc producers surely the British Columbia plant has as good, if not a better, claim than the Australian one.

Portland Canal District

G. B. Turner and associates, who recently acquired the Indian Group of Mineral Claims, Portland Canal District, are having supplies packed in over the snow so that an early start may be made on development work.—Three crown granted mineral claims owned by the Portland Canal Mining Co. Ltd., of Vancouver B. C., have been bonded by C. S. Baker and associates. The claims are situated on American Creek and there is a good trail from the Bear River Trail to the property. Considerable work already has been done on the ore showing, a tunnel having been driven 100 feet in addition to numerous open cuts. Samples have run as high as 700 ounces silver to the ton.—The Premier Mine from the first of the year has shipped 11,800 tons of ore and concentrates. In the week prior to the present writing 2,400 tons were shipped.

Dolly Varden

No announcement has yet been made as to the plans of the Taylor Engineering Company for 1922 with reference to the Dolly Varden Mine and railroad. The assumption is that, if development is not continued on the former, the railroad will operate at least to the extent necessary to handle the ore offering from properties of the district. There is a probability that work will be done on the Wolf Group, north of the Dolly Varden, with a view to the proving of ore bodies believed to belong to the same formations as those of the Dolly.— The Consolidated Homestake Mining and Developing Company proposes placing a 150-ton concentrating mill on its property in the Kitsault River section of the Alice Arm District. The installation of a hydro-electric plant on Clearwater Creek, one and a half miles away, also is planned. Tunnelling is in progress on two veins, one of which is fifty feet wide. Conservative estimates it is said indicate that the ore carries about $25 a ton in gold, silver and copper values.

New Lead Schedule

A new lead schedule has been issued by the Consolidated Mining and Smelting Company which, it is said, will have the effect of adding about $4 a ton to the value of the average Slocan District lead ore. Both the deductions and the zinc penalties are reduced and a larger proportion of the New York exchange is allowed shippers. The changes in detail follow:

1: A larger proportion of the exchange on gold and silver will be allowed to the shipper, especially when the exchange is at a low rate.

2: Instead of a deduction of 1½ cents from the London lead quotation, the deduction will be 1¼ cents.

3: There will be a charge of only 30 cents a unit for zinc, instead of 50 cents a unit as recently.

American Boy Mine

E. T. Davey, of Mullen, Idaho, president and managing director of the West Hunter Mining Co., Idaho, was visiting Kaslo B. C. recently after an inspection of the American Boy Mine, situated near Sandon B. C. Mr. Davey thinks this property has possibilities and work will be resumed on it. Approximately half a million dollars in mineral values has been taken out of the American Boy and Mr. Davey believes that there is a large tonnage of carbonates remaining which will average 30 oz. silver, 20 per cent. lead and 15 per cent. zinc as well as some small bodies of high grade ore. Only 15 per cent. of the vein showing has been opened up, it is said, while of the latter only 35 per cent has been developed, so that there is much to be done and the prospects are good. In No. 5

The Canadian Miners' Buying Directory.

Acetylene Gas:
Canada Carbide Company, Ltd.
Prest-O-Lite Co. of Canada, Ltd.

Acetylene Welding:
The Toronto Iron Works, Ltd.

A.C. Units:
Powley & Townsley, Limited.

Agitators:
The Dorr Co
Can. Chicago Bridge & Iron Co., Ltd.
Horton Steel Works, Limited.

Air Compressors:
Belliss & Morcom, Ltd
Engineering & Equipment Co., Ltd.
Laidlaw & Lamb
Sullivan Machinery.

Air Hoists.
Engineering & Equipment Co., Ltd
Canadian Ingersoll-Rand Co., Ltd

Air Receivers:
Engineering & Equipment Co., Ltd.
The Toronto Iron Works, Ltd

Alloy and Carbon Tool Steel:
Peacock Brothers Limited.

Alternators:
MacGovern & Co

Aluminium:
Spielman Agencies, Regd

Amalgamators:
Engineering & Equipment Co., Ltd.
Northern Canada Supply Co.
Mine and Smelter Supply Co
Wabi Iron Works

Antimony:
Canada Metal Co.

Antimonial Lead:
Pennsylvania Smelting Co

Assayers' and Chemists' Supplies:
Dominion Engineering & Inspection Co.
Lymans, Limited
Mine & Smelter Supply Co.
Pennsylvania Smelting Co
Stanley, W. F. & Co., Ltd.

Ash Conveyors:
Canadian Link-Belt Company
Engineering & Equipment Co., Ltd

Ashes Handling Machinery:
Canadian Link-Belt Co., Ltd

Assayers and Chemists:
Milton L. Hersey Co., Ltd
Campbell & Deyell
Ledoux & Co.
Thos. Heys & Son
C. L. Constant Co.

Asbestos:
Keritt & Co

Balls:
Hull Iron & Steel Foundries, Ltd
Peacock Brothers Limited.
The Wabi Iron Works.
The Hardinge Conical Mill Co
The William Kennedy & Sons, Ltd.

Ball Mills:
Hardinge Conical Mill Co
Hull Iron & Steel Foundries, Ltd
Mine & Smelter Supply.
The Wabi Iron Works

Babbit Metals.
Canada Metal Co.
Hoyt Metal Co.

Ball Mill Feeders:
Hardinge Conical Mill Co
Hull Iron & Steel Foundries, Ltd
Mine & Smelter Supply

Ball Mill Linings:
Hardinge Conical Mill Co
The William Kennedy & Sons, Ltd
Peacock Brothers, Limited
Hull Iron & Steel Foundries, Ltd
Mine & Smelter Supply.

Balances — Assay & Analytical:
Mine & Smelter Supply
The William Kennedy & Sons, Ltd

Belting—Leather, Rubber and Cotton:
Canadian Link-Belt Co., Ltd
Northern Canada Supply Co
Jones & Glasco.

Belting:
R. T. Gilman & Co
Gutta Percha & Rubber, Ltd

Belting—Silent Chain:
Canadian Link-Belt Co., Ltd
Hans Renold of Canada, Limited, Montreal
Jones & Glassco (Regd.)

Belting (Transmission):
Goodyear Tire & Rubber Co

Belting (Elevator):
Goodyear Tire & Rubber Co

Belting (Conveyor):
Goodyear Tire & Rubber Co
Gutta Percha & Rubber, Ltd.

Bins and Hoppers:
The Toronto Iron Works, Ltd.
Can. Chicago Bridge & Iron Co., Ltd.
Horton Steel Works, Limited.

Blasting Batteries and Supplies:
Canadian Ingersoll-Rand Co., Ltd
Mussens, Ltd.
Canadian Explosives, Ltd.
Powley & Townsley, Limited.

Bluestone:
The Consolidated Mining & Smelting Co
The Conlagas Reduction Co., Ltd.

Blowers:
Canadian Fairbanks-Morse Co., Ltd
Engineering & Equipment Co., Ltd.
Northern Canada Supply Co.

Boilers:
Canadian Ingersoll-Rand Co., Ltd
Marsh Engineering Works
R. T. Gilman & Co.
The John Inglis Company
Wabi Iron Works.
The William Kennedy & Sons, Ltd.

Blue Vitriol (Conlagas Red):
Canadian Fairbanks-Morse Co., Ltd

Borts and Carbons:
Diamond Drill Carbon Co.

Boxes, Cable Junction:
Standard Underground Cable Co. of Canada, Ltd
Northern Electric Co., Ltd.

Brazilian Rough Diamonds:
Diamond Drill Carbon Co

Brazilian Mica:
Diamond Drill Carbon Co

Buggies, Mine Car (Steel)
Hendrick Manufacturing Co

Brazilian Ballas:
Diamond Drill Carbon Co

Brazilian Rock Crystal:
Diamond Drill Carbon Co

Brazilian Tourmalines:
Diamond Drill Carbon Co.

Brazilian Aquamarines:
Diamond Drill Carbon Co

Bridges—Man Trolley and Rope Operated—Material Handling
Canadian Mead-Morrison Co. Limited

Bronz, Manganese, Perforated and Plain:
Hendrick Manufacturing Co

Buckets:
Canadian Ingersoll Rand Co., Ltd
Engineering & Equipment Co., Ltd
R. T. Gilman & Co.
Hendrick Manufacturing Co
Canadian Link-Belt Co., Ltd
Marsh Engineering Works
Mussens, Ltd.
MacKinnon Steel Co., Ltd
Northern Canada Supply Co.
The Wabi Iron Works
The William Kennedy & Sons, Ltd

Buckets, Elevator:
Canadian Link-Belt Co., Ltd
Engineering & Equipment Co., Ltd
Hendrick Mfg. Co
Peacock Brothers Limited
The William Kennedy & Sons, Ltd

Cable—Aerial and Underground:
Canada Wire & Cable Co
Northern Canada Supply Co
Standard Underground Cable Co. of Canada, Ltd
Peacock Brothers, Limited

Cableways:
Canadian Mead-Morrison Co. Limited
Engineering & Equipment Co., Ltd
Fraser & Chalmers of Canada, Ltd
Mussens, Ltd
The Wabi Iron Works
R. T. Gilman & Co

Cages:
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Engineering & Equipment Co., Ltd
Northern Canada Supply Co
Fraser & Chalmers of Canada, Ltd
The Mine & Smelter Supply Co
Mussens, Ltd.
Wabi Iron Works
The William Kennedy & Sons, Ltd

tunnel there is a large deposit of zinc ore, carrying high gold values of silver. Further development will start during the summer, probably in June, and Wm. J. J. Smith, at present superintendent of the Tamarack and Lucky Jim Mine, will be in charge.

Britannia Mine

N. J. Quigley, vice-president of the Britannia Mining & Smelting Co., arrived in British Columbia recently from El Paso, Texas, and has been inspecting the Company's properties on Howe Sound, near Vancouver B. C. Rebuilding operations now are in progress at Britannia Beach. A new concentrator is under way and the town, which was wiped out by flood, is being reconstructed on a different site. The concentrator will be of a modern type and is expected to cost, when completed and ready for work, about $800,000. It will be capable of producing 2,500 tons a day of copper concentrate and preparations already are in progress at the mine for operation on a larger scale. The old plant worked at the rate of about 1,000 tons a day. The old town consisted of some 182 homes. This number is to be considerably increased. H. F. Browning, general manager of the plant, states that the new equipment should all be in place and ready for use by the fall of the year. Mr. Quigley has left to visit Mexico properties in which he and his associates are interested.

Rush to Cedar Creek

Excitement grows over the gold discoveries in the Cariboo District. There already is a rush to the Cedar Creek section near Quesnelle Forks and not from the old Bullion Workings where the first claims were staked last year. When the snow disappears in May a stampede may be looked for if reports of the richness of the ground continue. It now is said that gold has been found on Spanish Creek, which is in the same locality. These finds are on high ground back from the waterways. This is the explanation of how the gold was overlooked by the miners of '62. Some four or five feet of snow still covers the country so that little will be done of a definite nature for some weeks. Meantime supplies are going in in large quantities, the road houses are crowded, and Williams Lake, the jumping-off point on the Pacific Great Eastern Ry., already is said to resemble to an extent the gold-frenzied communities that grew up like mushrooms in the Yukon during the Klondyke rush of '98.

Radium Ore On Valdez Island

The report of the finding of radium-bearing mineral on Valdez Island, Queen Charlotte Group, has resulted in the staking of numerous claims in that part of the Province. Exploration and development on a considerable scale will take place during the summer.

Prospectors Returning To Portland Canal

C. A. Mackenzie, one of the principal owners of the "M. C." Group of Mineral Claims, situated in the Portland Canal District and said to adjoin the property of the Premier Mining Company, has returned after a visit to Stewart. He says that prospectors and miners are beginning to return to the district after spending the winter outside. With the Premier working to capacity and in view of the established richness of that Mine he was assured that there will be many engineers over the Portland Canal region this summer inspecting claims under development. Mr. Mackenzie is on his way to California whence he will go to New York.

Victoria Prospectors' Association

A prospectors' association has been formed in Victoria the officers of which are Hon. President, George H. Aylard; President, G. E. Winkler; vice president, Thos. Colby; secretary-treasurer, G. B. Kitto; Executive, F. P. Slavin, C. W. Frank, P. B. Pinnett, and James Miller.

TURBINAIR HOIST

On page 152 of our issue of March 17th there appeared an illustration of a column hoist, which had inadvertently been intercharged for another, and credited to the wrong manufacturer. In correcting this mistake, on page 185 of the issue of March 31th, the cut used was again wrongly ascribed to a third company. It never rains but it pours!

We reproduce herewith the illustration of the Turbinair Hoist, manufactured by the Sullivan Machinery Company, of Chicago and Toronto. The Journal offers its apologies for having made this double mistake.

The Congo has become a factor in the world's production of gold, though its production is less than $2,500,000 a year. An extensive mineralized area has been discovered by prospectors of the Nile-Congo Syndicate, which belongs to the Tanganyika Concessions group. The discovery is described as of alluvial gold, which is said to have been traced in several rivers. What is believed to be the source of this gold has also been discovered in the form of an auriferous belt of rocks extending several miles. An old working carrying copper and gold has also been discovered, with evidence of an ancient copper-smelting industry in the vicinity.

Jones & Glassco Reg'd., of Montreal and Toronto, have been appointed the Sole Canadian Agents for the Unchokeable Pump Limited of London, England.

The Unchokeable Pump is constructed on the Centrifugal principle but so designed that fibrous solids, skins, sacking, etc., will pass through it without diffienlty. It is specially constructed to withstand the hard grinding work inseparable from the constant pumping of all kinds of fibres, semi-solids and solid matter. No screens are necessary for large objects, and practically anything capable of passing through the suction, the pump will discharge.

Canadian Miners' Buying Directory.—(Continued)

Cables—Wire:
Standard Underground Cable Co of Canada, Ltd.
Canada Wire & Cable Co.
R. T. Gilman & Co.

Cable Railway Systems:
Canada Wire & Cable Co.

Cam Shafts:
Hull Iron & Steel Foundries, Ltd.
Peacock Brothers Limited.
The William Kennedy & Sons, Ltd.

Car Dumps:
Sullivan Machinery Co.
R. T Gilman & Co.

Carbide of Calcium:
Canada Carbide Company, Ltd.

Cars:
Engineering & Equipment Co., Ltd.
John J. Gartshore
MacKinnon Steel Co., Ltd.
Northern Canada Supply Co.
Marsh Engineering Works
Peacock Brothers, Limited
Mussens, Limited
Powley & Townsley, Limited.
R. T. Gilman & Co.
The William Kennedy & Sons, Ltd.

Car Wheels and Axles:
Canadian Car Foundry Co., Ltd
Burnett & Crampton
Hull Iron & Steel Foundries, Ltd
John J. Gartshore
Marsh Engineering Works, Ltd
Peacock Brothers Limited
The William Kennedy & Sons, Ltd.

Carriers (Gravity):
Jones & Glassco

Castings—Brass
The Canada Metal Co., Ltd

Castings (Iron and Steel)
Hull Iron & Steel Foundries, Ltd
Peacock Brothers Limited.
The William Kennedy & Sons, Ltd.

Cement Machinery:
Engineering & Equipment Co., Ltd.
Hadfields, Limited
Hull Iron & Steel Foundries, Ltd
Burnett & Crampton
The William Kennedy & Sons, Ltd.

Chains:
Jones & Glassco
Northern Canada Supply Co
Canadian Fairbanks-Morse Co., Ltd
Canadian Link-Belt Co., Ltd
Greening, B., Wire Co., Ltd.

Chain Drives:
Jones & Glassco (Regd.)

Chain Drives—Silent and Steel Roller:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal
Jones & Glassco) Regd.).

Chemical Apparatus:
Powley & Townsley, Limited.

Chemists:
Canadian Laboratories
Campbell & Deyell
Thos. Hayes & Sons
Milton Hersey Co
Ledoux & Co.
Constant, C. L. Company

Chroms Ore:
The Electric Steel & Metals Co
Everett & Co.

Classifiers:
Mussens, Limited
Fraser & Chalmers of Canada, Ltd
The Wabi Iron Works
R. T. Gilman & Co
The Dorr Company

Clutches:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal

Coal:
Dominion Coal Co
Nova Scotia Steel & Coal Co

Coal Cutters:
Sullivan Machinery Co
Canadian Ingersoll-Rand Co., Ltd
Peacock Brothers, Limited

Coal Crushers:
Canadian Mead-Morrison Co., Limited
Canadian Link-Belt Co., Ltd
Peacock Brothers Limited

Coal Mining Explosives
Canadian Explosives, Ltd
Giant Powder Company of Canada, Ltd

Coal Mining Machinery:
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd
Canadian Ingersoll-Rand Co., Ltd
Engineering & Equipment Co., Ltd.
Sullivan Machinery Co.
Marsh Engineering Works
Hadfields, Ltd.
Hendrick Mfg. Co.
Powley & Townsley, Limited.
Mussens, Limited

Coal and Coke Handling Machinery
Canadian Link-Belt Co., Ltd.
Powley & Townsley, Limited.

Coal Pick Machines:
Sullivan Machinery Co.

Coal Screening Plants:
Canadian Link-Belt Co., Ltd.

Cobalt Oxide:
Coniagas Reduction Co.
Everitt & Co.

Compressors—Air:
Engineering & Equipment Co., Ltd.
Smart-Turner Machine Co.
Canadian Ingersoll-Rand Co., Ltd
Mussens, Limited
Peacock Brothers, Limited

Concrete Mixers:
Gould, Shapley & Muir Co., Ltd
MacGovern & Co., Ino
Mussens, Limited

Condensers:
Smart-Turner Machine Co.
Northern Canada Supply Co
Belliss & Morcom, Ltd.
Laurie & Lamb
Peacock Brothers, Limited

Concentrating Tables:
The Mine & Smelter Supply Co
Deister Concentrator Co

Converters:
Northern Canada Supply Co.
MacGovern & Co., Inc.

Conveyors—McCaslin Gravity Bucket:
Engineering & Equipment Co., Ltd.
Canadian Mead-Morrison Co., Limited

Contractors' Supplies:
Canadian Fairbanks-Morse Co., Ltd.

Consulters and Engineers:
Hersey Milton Co., Ltd.

Conveyors:
Canadian Link-Belt Co., Ltd.
Jones & Glassco (Regd.)
Powley & Townsley, Limited.

Conveyor Belts:
Gutta Percha & Rubber, Ltd.

Conveyor Flights:
Canadian Link-Belt Co., Ltd
Hendrick Mfg. Co., Ltd.

Conveyor—Trough—Belt:
Canadian Link-Belt Co., Ltd.
Hendrick Mfg. Co.
Mussens, Limited
Jones & Glassco (Roller, Belt and Chain)
Hendrick Mfg. Co.

Conical Mills:
Hardinge Conical Mill Co.

Copper:
The Canada Metal Co., Ltd
Consolidated Mining & Smelting Co

Couplings:
Hans Renold of Canada, Limited, Montreal.

Cranes:
Canadian Mead-Morrison Co., Limited
Canadian Link-Belt Company
Peacock Brothers, Limited
R. T. Gilman & Co.
Smart-Turner Machine Co

Crane Ropes:
Allan Whyte & Co.
Canada Wire & Cable Co
Greening, B., Wire Co., Ltd
Peacock Brothers, Limited

Crucibles:
The Mine & Smelter Supply Co

Crusher Balls:
Canada Foundries & Forgings, Ltd
Hull Iron & Steel Foundries, Limited, Hull, Que.
Osborn, Sam'l (Canada) Limited
Peacock Brothers, Limited
Swedish Steel & Importing Co., Ltd
The William Kennedy & Sons, Ltd

Crushers:
Canadian Steel Foundries, Ltd
Engineering & Equipment Co., Ltd
Hull Iron & Steel Foundries, Ltd
Hardinge Conical Mill Co
Lymans Ltd
Mussens, Limited
Osborn, Sam'l (Canada) Limited
The Electric Steel & Metals Co, Ltd
R. T. Gilman & Co

Northern Ontario Letter

THE GOLD MINES

Power Shortage Over

At the time of writing this letter, the weather is mild and warm, rain is falling. The great stacks of snow are settling fast and already the water is flowing rapidly into the lakes and rivers. This has completely relieved the power shortage for the present and will now permit all mines to operate at maximum capacity.

Dome.

An official statement of achievements at the Dome Mines for the eleven months ended February 28th shows earnings of over one million dollars. The financial reserve in bonds, cash and call loans amounts to about two and a quarter million and thereby reflects the outstanding success of the past year's operations. The indications are that no difficulty will be experienced in making net earnings of from $3 to $4 per share annually.

West Dome—Dome Lake Merger.

The directors of West Dome Consolidated and Dome Lake have ratified the proposed merger of the two properties. The management are confident that the combined properties can be operated profitably.

Power Conference

An important conference relating to the industrial progress of this part of Northern Ontario was held last Thursday in Toronto.

The T. and N. O. Railway Commission is in conference with the Hollinger Consolidated Gold Mines and the Abitibi Power and Paper Company in connection with arriving at some mutually advantageous plan whereby the big water powers on the Abitibi River may be turned to early industrial use.

Heretofore the Abitibi has claimed priority rights while the Ontario Government has hinted at reservation of further development for the electrification of the T. and N. O. Railway. In addition to this, the Hollinger Consolidated Gold Mines have endeavored to secure rights to develop energy. These organizations may be correctly referred to as "The Big Three" of this part of Northern Ontario. The T. and N. O. occupies a place of great importance and influence, the Hollinger Consolidated is now rated as the leading gold mine of the world, and the Abitibi Company is one of the world's greatest newsprint producers.

The main point is that there is ample hydro-electric energy potentially available for every industrial concern in this part of the country. This round table conference has been necessary for some time, and has been long deferred.

In an interview with the Journal, A. F. Brigham, general manager of the Hollinger Consolidated, pointed out that his company has the money and the desire to go ahead with the development of power. He referred to the fact that the present situation could scarcely be excused, in that all that was required to assure development is authority form the Ontario Government to go ahead. As to this, of course, the Government has hesitated between the desire to yield to the request of the Hollinger and the duty it may owe to the Abitibi as well as the interests of the T. and N. O. Railway.

This conference is said to be a preliminary to another discussion, to take place on April eleventh. Although the Northern Canada Power Company is fortified behind established hydro-electric plants and carefully drafted contracts to supply the leading mines of Porcupine with energy, yet this company is not mentioned in connection with the conference. This fact has occasioned considerable wonder and surprise.

Wright-Hargreaves

Following the completion of the station at the 550-ft. level of the Wright-Hargreaves Mine, the work of sinking is being continued and should reach the 700 ft. level by the second week in May. In the meantime, in addition to continuing operations at the upper levels, particularly at the 400-ft. level, the opening up of the 550-ft. level is also under way. There is already evidence that the ore is as good if not actually better at the 550-ft. level than on the upper levels. The drifting operations at the new level are already supplying a substantial tonnage of ore for the mill.

During the month of March, the mill treated an average of approximately 180 tons daily, this being a little lower than during the preceding month, for the reason that a break in one of the crushers caused a delay. Production, however, continued about normal and will approximate $65,000 for the month.

A favorable recent development has occurred in the east cross-cut at the 400-ft. level where the downward continuation of a rich ore shoot, has been cut, formerly worked at a depth of 300 feet through the No. 1 shaft.

Queen Lebel

Arrangements have been made to instal a mining plant on the property of the Queen Lebel. The equipment is now on the way to the mine, and will be installed as rapidly as possible. This new property lies immediately to the east of the Kirkland Lake Proprietary and is regarded as being one of the more attractive prospects in this area. T. J. Flynn is consulting engineer for the company, and the financing is being done largely in Kitchener, Ont.

Rich ore at Sylvanite

A rich strike has been made on the Sylvanite Mine, at a depth of 390 feet. The ore has a width of from seven to nine feet and is typical of the rich shoots on the Lake Shore, Wright-Hargreaves and Kirkland Lake Proprietary. The values closer to surface had been found to be scattered in a number of stringers, but these have now coalesced and form an excellent orebody. In the meantime, a working station having been cut at this depth, the work of sinking to a depth of 520 feet is to be continued. Effort will centre largely on this sinking, and lateral operations will not be undertaken until the 520-ft. level is reached. Great importance may be attached to this rich strike on the Sylvanite, in that it occurs in the main break along which the adjoining Wright-Hargreaves on the west is getting its ore, and in which the adjoining Kirkland Lake Proprietary on the east is developing high grade ore. The property is about 1,500 feet in width between these two adjoining mines.

Wisconsin-Skead

After being idle for over two years, the Wisconsin-Skead Gold Mines will again be operated, the question of transportation facilities being now considered. It is believed a gasoline tractor will be used for hauling in supplies, and that this method will remove the serious handicap under which the property was formerly operated. It is stated that $280,000 have been spent heretofore in opening up the property.

EDITORIAL

Alaska, Northern British Columbia and the Yukon were considered worthless, because the farmer denounced them as unfit for agriculture, till the prospector and the miner cultivated their mineral crops. And the same will probably prove true of that vast, forbidding, forested country, the Labrador Peninsula, including the whole ridge between the St. Lawrence water system and Hudson Bay.--Dr. James Douglas--1909.

A PICTURE WITH TWO SIDES

In reckoning our national resources in the way of minerals asbestos bulks large. The mines of the Thetford district in Quebec provide 85 per cent. of the world's annual supply of asbestos, and constitute the bulk of the Province's mineral production. Almost all this asbestos is exported to the United States, to be re-exported or manufactured. As the value of the manufactured material is many times what it is worth when it leaves Canada, it can logically be said that the United States has a larger interest in our asbestos mines than have we Canadians.

How can Canada reap more benefit from the silky fibre that Nature has provided so bountifully? This question is now current, as it is periodically. Some believe that sufficient co-operation among the principal producers would result in an enhanced value for all grades of fibre; but the interests of these producers are so divergent that there seems little hope of such agreement. The latest proposal, not new, but re-iterated, is that an export duty should be imposed. The effect of this, as seen by a former Canadian, now resident in New York and a miner and seller of Canadian asbestos, is well set forth in a recent letter to the Montreal "Gazette" by Mr. B. Marcuse.

The fiscal policy of the United States, which has been fairly consistent for years past and will remain for years to come, precludes the possibility of importing manufactured materials from Canada, where a similar tariff results in high manufacturing costs. The only object of an export tax on asbestos would be to stimulate its manufacture in Canada. The United States is the chief market, and from it Canada's manufactured asbestos would be virtually excluded.

Canada's asbestos deposits are unique only in that they are large, accessible, and capable of economical operation. Many other asbestos districts, particularly that in Rhodesia, need only a fillip such as the Quebec legislature proposes to give them, in order to seize the world's principal markets.

There are two sides to this question, and we are confident there will be at Quebec no hasty action in the matter. To make the most out of our raw materials is a worthy object, and one that we must pursue always. But we must regulate our actions in accord with economic principles, else we will repeat on this side of the border the tariff comedy now being staged by our neighbors.

INVENTORY

The deficit of the Canadian National Railways for the past year is estimated at $72,000,000.

Cutting down expenditure and operating costs may for a time reduce this amount in slight degree. Economies, *per se*, are needed. Economies at the risk of lessening efficiency are to be strongly deprecated. Insufficient expenditure on maintenance over a short period means doubled outlay in the future.

The Canadian Mining Journal was first in drawing attention to the unquestionable fact that permanent improvement in the freight earnings of our railways can be brought about only by the expansion of the mineral industries. On August 15th, 1909, the Journal printed an outstanding article from the pen of that great Canadian, Dr. James Douglas. Dr. Douglas, always a pregnant source of ideas and of inspiration, had turned dry statistics into living fact. Since that time the journal has not ceased to urge the importance of mineral development to our railways.

In this position the Journal has been sustained and confirmed by none more ably than by Dr. Charles Camsell, Deputy Minister of Mines, in his recent calm statement of facts.

"The mining industry, therefore, is bound to be an important factor in assisting to place our National Railways on a paying basis, and the point that I wish to emphasize is that the part that this industry can and will play in this connection is far greater than the people of this country, and perhaps even our railway administrations, realize. A study of this question has fully convinced me of the great value of the mining industry to railways, and has led to the consideration of some plans whereby the Department of Mines might co-operate with the National railways to bring about a development of the mineral resources tributary to these railways, and I trust that this co-operation will become a fact."

But Dr. Camsell and his pregnant statistics will not

energy and good-will that mortal men can muster, cannot overtake the work in hand, much less make the progress the occasion demands. Our new administration in Ottawa must face this fact squarely. Let us illustrate.

The Geological Survey and Mines Branch have, through field and laboratory examinations, made a valuable survey of Canada's commercially useful rocks. Yet annually we are wasting millions of money by using inferior wayside road-metal, instead of good trap rock. The public is ignorant; the public awaits instruction. The railroads need the freight.

Limestone is a valuable fertilizer. There is plenty of limestone available throughout the Dominion at strategic points. The public do not realize its usefulness, and need instruction and demonstration. The railroads need the freight.

Throughout Canada there are huge deposits of low-grade iron ore. In two places methods for commercial "beneficiation" are on the verge of success. An effort of national dimensions is required to make success complete. The public is, in the main, ignorant of the problem. The railroads need the freight.

Our resources in feldspar, gypsum, barite, talc, china-clay, are far beyond the present demand. Their production needs thorough-going organization, based on lines that the officers of our Department of Mines can best point out. The railroads need the freight.

If the work of the Mines Branch and of the Geological survey can be co-ordinated with the potential effort of the public, the way will be clear for a rapid development of our mineral resources. How can this be effected?

At present there is a technical officer of the Department of Mines whose special function it is to give to the public the information it wishes. He is doing the work of two men. If he could divide himself into six parts, and each part do a day's work, all would be over-worked. There is no money to provide him with assistants. Consequently the public does not get the aid it should, and progress within the department is stifled under a staggering load of routine. This is typical of the conditions under which our hard-worked and poorly-paid scientists are working.

The Hon. Mr. Stewart has recently recommended that appropriations be made sufficient to pay our technical officers in the Department of Mines decent salaries. This is the first step. The next step is to increase the numbers of the staff up to the point where education of, and collaboration with, the public can take its proper place alongside the technical work. Then the two branches of the Department of Mines will bring results that will wipe out our railway deficits within a short space of years.

PORPHYRY CONTACT ZONES

At Porcupine, Kirkland Lake, Matachewan and Shiningtree, there are masses of porphyry near the gold deposits. In some cases the gold deposits are partly enclosed by porphyry, in others they skirt it. In some cases the porphyry is merely waste rock, while elsewhere it constitutes a part of the ore. Some veins showing good ore a short distance away from the masses of porphyry, decrease in value near or in it. The variety of occurrences gives no conclusive idea of the actual connection between the porphyry and the gold deposits; but enough has been observed to make it advisable to search closely for gold in the neighborhood of porphyry intrusions in Northern Ontario.

At Cobalt there has long been significance attached to the fact that diabase intrusions occur near the silver deposits. Comparatively little silver has been mined from the diabase itself, but most of the silver has come from within a few thousand feet of the intrusive rock. The gold deposits are on a larger scale than the silver veins, and a somewhat wider zone should be prospected for gold. There is really very little known about the origin of the gold deposits, and there are few safe guides for prospectors; but the suggestion of Mr. Tom Saville that prospectors watch these contacts for mineralized schist and "pan and keep on panning," seems a good one. By the way it might be profitable for prospectors to make more use of mortar and pan than has been the case in recent years.

The special brand of porphyry that is associated with gold deposits in one area may be in many respects different from that in another area. Some are red while others are gray or white. The intruded rocks are grey and dark-gray basalts and other volcanics, conglomerates, slates and other sediments. The gold deposits are not what are called contact deposits in a technical sense. They are, however, for some reason yet unknown, associated with intrusions of porphyry. Prospectors would be well advised to examine the areas near masses of porphyry with special care and to work away from the porphyry into the basalt and schist as far as there is evidence of mineralization. This may be for miles or only a few thousand feet. Mr. Saville has "hit the nail on the head" in this case as well. We have little doubt that exploration will result in discovery of gold deposits in Northern Ontario where there are no porphyry masses; but those who would make use of observed facts will give the porphyry contact zones close scrutiny.

OPPORTUNITIES IN ROCKS

Since history began, we have records of the interest of the human race in the production of the precious metals. The inhabitants of this globe to-day are no exception. "Gold" is still a magic word, and the mention of "silver" is sure to attract attention. Yet these two metals play a comparatively unimportant part in the daily life of the average man. Our interest to-day in the precious metals is a cumulative inheritance from predecessors who, through centuries of troublous times, have found them to be attractive ornaments, useful mediums of exchange, and wealth easily hoarded, conceal-

ed and transported. Their intrinsic value today is more apparent than real; yet the habits of ten thousand years are not to be easily overcome, and gold and silver will for many a year continue to retain their preeminence in the minds of men.

Of far greater importance to our civilization are the non-metallic minerals, usually lumped under that term, and considered in a very sketchy way by the average citizen, or even by the average engineer. That these prosaic minerals are of the utmost importance may be gauged by the fact that without clay, we would have no bricks, no cement, no pottery-ware or china of any kind. Without gypsum, we would still wait months for our plaster walls to dry. Unless limestone were abundant, we could have no walls of stone except dry walls. If Nature had provided no beds of salt, the sea would yield us the table variety only at great cost, and for potash we would still be dependent upon the ashes of trees and kepy. Unless there were hard trap-rock available, our road-builders would continue to waste millions of money annually on soft rock surfaces, as at present.

Our non-metallic minerals deserve more attention than they receive. In some cases, such as the manufacture of cement, opportunities are quickly grasped. The cement industry is well-organized—too well-organized just at present, some people think. The exploitation of some other non-metallic minerals has still to be organized in a thorough-going way. Two such instances are suggested in our columns today. The gypsum trade and the feldspar trade need broad-gauge organization, particularly the latter. The exploitation of our feldspar resources has, until lately, been relegated largely to amateur miners and to mine foremen. Its organization along the lines of modern engineering and business (but not "finance"!) should yield a handsome return on the initiative expended.

The most important of all non-metallic materials in Canada just now, and the least considered, is road metal. The Provinces have embarked upon a large and extended programme of road-building; yet the roads already built have, in general, a cheap surface, made of limestone, soft mine rock, or what-not, which wears out completely in three or four years. This is poor engineering, and a worse investment. When the public come to realize that a few dollars more per mile would have given them roads surfaces that would last two, three or four times as long as the present soft surfaces, they will blame both engineers and administrators. Shoddy work seldom pays. The responsibility for shoddy road surfaces will, presently, bear heavily upon the builders.

EDITORIAL NOTES

The Canadian Mining Journal is pleased to announce that it has secured the services of a correspondent eminently suited to represent it in Nova Scotia. The trenchant criticism in the last two issues, dealing with the coal mining situation, speaks an intimate acquaintance with Nova Scotian affairs that augurs well for the success of our new coadjutor.

The Journal's recent unkind words about the stamp-mill have brought a rather touching rejoinder in the form of the song sung by this giant in the prime of his strength, when as yet his might was unchallenged. This song is not mere versification: it is the nearest approach to true poetry that we have published for some time. Its quality will be best appreciated if read aloud.

Less than a year ago the coal industry of Britain was in the throes of a strike. Today it is prosperous and progressive. The miners are working hard, and are earning good wages. The reason is that the miners are, collectively, responsible for the rates of wages they obtain, which will drop with a lessened production.

The same case is up for decision in Nova Scotia. The outrageous policy of "striking on the job" has failed. It is possible that a "collective labour contract" may prove the solution of the difficulty there, as in Britain.

PERSONALS

Mr. Percy E. Hopkins of the staff of the Department of Mines, Ontario, will leave shortly for the field. He will examine and map gold areas east of Kirkland Lake. Later in the season he will visit the Schreiber gold area.

Mr. A. G. Burrows will revisit the Porcupine gold area this season. Mr. Burrows mapped the area some years ago for the Department of Mines.

THE SONG OF THE STAMP-MILL

This is the song that the stamp-mill
    Thunders all night and all day;
The song that it sings to the watchers
    Watchers, working for pay
        Thumpetty — strumpetty thump
        Strumpetty — thumpetty thump
        A strumpet is gold,
        Let all men be told!
        But I am so made
        That I capture the jade
        Tries she to 'scape'
        Ha! that is a jape!
        I chase her, embrace her,
        Till, wanton no longer,
        She finds me the stronger
        Thumpetty — strumpetty — thump
        Strumpetty — thumpetty — thump
This is the song that the stamp mill
    Thunders all day and all night.
The song of the chase and the capture,
    The song of predominant might.

ANON

Honourable Charles Stewart

To those engaged in the mining industry throughout Canada, interest in the new federal ministry centres upon Hon. Chas. Stewart, who holds the portfolio of Minister of Mines. As Mr. Stewart is, in addition, Minister of the Interior, Minister of Immigration and Colonization, and Superintendent-General of Indian Affairs, he carries an exceptionally heavy share of administrative responsibility.

The functions of Mr. Stewart's departments, and the problems with which they are concerned, are chiefly developmental. To these departments, perhaps more than to any other governmental agencies, the Canadian people are looking for the initiation of policies which will hasten business recovery and the return to substantial national growth.

HON. CHARLES STEWART

To his new posts Mr. Stewart brings personal and public experience of singularly practical value. Born at Strabane, Ontario in 1868, he removed to the west in 1905, homesteading near Killam, Alberta. As a pioneer western farmer Mr. Stewart acquired, first hand, the intimate knowledge of settlement conditions which is essential to a clear understanding of immigration and colonization problems. He appreciates, as only a successful pioneer farmer can appreciate, the difficulties that face the individual settler and the lines along which public policies in regard to land settlement must be directed to ensure sound development.

Above all, Mr. Stewart's grasp of public problems is not restricted to land settlement and agriculture. He has been one of Western Canada's outstanding advocates of diversified growth to bring into effective use not only new farming areas but minerals and all other natural resources which will build up industrial population, offer agriculture a large and dependable home market, and give the Dominion, as a whole, much better-balanced development.

Mr. Stewart entered the Alberta legislature in 1909, being elected by acclamation in that year and again in 1913. In 1917 he became Premier of Alberta succeeding the late Hon. A. L. Sifton. At various periods during his provincial career Mr. Stewart held the portfolios of Minister of Municipal Affairs, Minister of Public Works and Minister of Railways and Telephones. He has, therefore, enjoyed an exceptionally broad administrative experience and is, in addition, credited with much progressive legislation designed to meet the peculiar needs of Western Canada.

Honourable Mr. Stewart has assumed office at a period when the public mind has fastened the greatest hopes and expectations upon his post as a factor in solving the Dominion's most pressing problems. The character of his private and public experience will be a source of public assurance that the policies of his departments will be shaped by a thorough practical understanding of the services they must render.

CORRESPONDENCE

Brooklyn, N. Y.
April 10, 1922

One Grubstaker

Editor, **Canadian Mining Journal,**

Sir:— My attention has been drawn to your editorials and articles on the prospector.

Although I agree with much that you say in praise of the prospector, I wish to state that my own experience in employing prospectors has been extremely disappointing.

For 25 years I have been actively interested in mining. Of more than 20 prospectors that I have grubstaked at least 18 have caused me loss. With one I broke square, and with another I shared the proceeds of the sale of a Nevada property. This very nearly but not quite, reimbursed me for my total outlay (with interest). But I had nothing to make up for long years of mental anguish.

Perhaps prospectors in Canada are more reliable than they are in our country. I do not know. But I do know that it is a very hard thing to judge your man correctly.

For this reason I would go further than you suggest in your columns—I would have every prospector examined and certified by official authorities. This would save many a fruitless chase after *Anser Americanus* (I have forgotten my botany so, please, see if this is correct.)

Twice I have crossed the continent to look at "mountains" of ore that did not exist. Of course I should have known better. Anyway my grubstaking days are over and done with. But as I say the same thing every Spring, I may have something more to write you on the subject next Winter after the snow falls.

Yours etc.

Grubstaker.

Conditions in the Feldspar Industry of the United States

Abstracted by N. B. Davis.

THE U. S. Bureau of Mines recently issued a Mineral Technology Bulletin (Serial No. 231), describing conditions in the United States Feldspar Industry, as reported on by Mr. Raymond B. Ladoo.

Some of the principal points set out by Mr. Ladoo are as follow:

(1) Many grinding companies do not own or control all or even a major part of their sources of crude material, but buy in job lots from many sources.

(2) There is great need of more adequate engineering and chemical control over mines and mills.

(3) Out of date, inefficient methods and equipment for mining and grinding are in common use.

(4) Little or no cooperation exists between feldspar producers, but on the contrary many feldspar companies are exceedingly secretive; this tends towards (a) preservation of obsolete methods (b) want of knowledge of the essential features of production, market requirements, and the relation between total milling and consuming capacities of the country; (c) inefficient and often mistaken trade practice; (d) unprofitable and even ruinous competition in dull periods.

(5) The small size of many feldspar deposits precludes maintenance of an efficient organization at each individual mine.

(6) Many of the best deposits of feldspar situated close to railroads are becoming depleted, which results in gradual lowering of grades and increase in cost for better grades.

(7) There is a lack of exact knowledge of the ceramic properties and behaviour of feldspar by some consumers, which results in (a) purchase of feldspar on the basis of price alone, thus encouraging low production costs at the expense of quality and (b) inefficient and expensive cross-hauling of both crude and ground feldspar.

(8) The grinding capacity of the country greatly exceeds the consuming capacity. There are more than 25 mills with a total capacity in excess of 300,000 tons per year, for a normal consumption of not more than 150,000 tons per year.

(9) There is a lack of uniform tests, specifications and standards of quality and fineness for different uses; and lack of standard definitions of grades.

Inefficient Methods and Equipment:

Inefficient methods of mining or quarrying, and out of date mills are in many cases responsible for undue waste, high costs and poor quality of product.

In the quarries visited, the proportion of good feldspar recovered to total material moved varies from 30 per cent to about 80 per cent and averages not more than 50 per cent, but a large part of the material wasted is good feldspar in small pieces or mixed with small amounts of objectionable impurities. The purer the feldspar the greater is its friability, and consequently the greater are the losses in fine sizes from blasting. In order to obviate this difficulty lighter blasts are used, which result in large blocks of feldspar. These blocks are sledged by hand, sorted and hand cobbed to remove impurities, but hand cobbing is slow and expensive. If very careful cobbing and sorting are attempted the costs may be unduly high, so the only alternative under this method is less careful work which results either in wasting large amounts of good feldspar or lowering the grade of product. At many quarries there are large dumps containing 50 to 80 per cent good feldspar either in fine sizes or in lumps mixed with impurities.

Many quarries are very poorly laid out. This is due to a lack of careful prospecting to determine the limits of the ore body before opening the quarries, and to lack of systematic planning. Several quarries were noted where large waste dumps have been allowed to accumulate on top of valuable parts of the feldspar deposits. The subsequent removal of this waste is expensive and the cost may be prohibitive. Some deposits have been opened by a series of small irregular scattered workings in such a way that efficient operation is impossible. While it is recognized that many feldspar deposits are so irregular in outline that no standard methods of quarrying may be used, still, many quarries would profit greatly if a definite scheme of development were determined and followed. Small scattered workings cause waste of ore, and are more difficult of supervision, require more equipment, and complicate systems of haulage and waste disposal.

In the milling of feldspar, inefficient methods and machines are even more prevalent than in quarrying operations. As at the quarries many needless re-handlings of ore by labor are common. At one plant the ore is unloaded by hand from the cars into wagons, hauled to the mill, unloaded by hand to the mill floor, sledged into small pieces, shoveled into wheelbarrows, wheeled and dumped into "chaser mills". In this type of mill so commonly used in feldspar grinding, the rock is crushed by heavy stone wheels revolving about a common axis on a bed. After being coarse ground, it is trammed by hand and dumped into pebble mills of the intermittent type. When the grinding is finished the feldspar is dumped on the floor, and shovelled by hand into storage bins. From the bins it is loaded by hand into motor trucks, hauled to the railroad and transferred by shovel and wheelbarrow into box cars. This method involves at least six changes by hand, while efficient methods should involve but one or two rehandlings at most.

Most of the feldspar grinding mills still use the old, inefficient types of grinding machinery which have been common for many years, although it is encouraging to note that a few mills have begun to install more modern equipment. For primary grinding the six foot "chaser mill" and for final grinding the intermittent pebble mill, or dump cylinder, are still so common as to be almost standard equipment. At most mills the crude ore is first crushed in a jaw crusher with manganese steel jaws, but in some mills the chaser mill feed is prepared only by sledging. The chaser mill should have little or no place in modern milling methods. It requires too much room and too much power for the work it does. The intermittent pebble mill is now of value mainly for grinding small batches where a small output of relatively coarse material is required. It is inefficient because it is intermittent and not continuous, because it requires much manual labor, because it occupies too much room in proportion to its capacity and because its principle of operation is incorrect for fine grinding. In this mill the grinding action is most effective in the first few hours and becomes progressively less efficient, because the cushioning effect of the fine material prevents free grinding by the pebbles. It has been aptly stated that fine grinding under these conditions is like trying to pulverize sea sand by striking the [illegible] Thomson

Small Size of Felspar Deposits

Inefficiency in feldspar mining cannot always be easily remedied. Unfortunately, as already stated, most feldspar deposits are not large. In many districts the deposits are small, irregular, scattered bodies situated in rugged areas distant from a railway or river, and with steep, sometimes impassable roads. Under such conditions, the owners of a deposit often cannot afford to maintain an efficient technical or business organization, or to install expensive machinery, and "ground hogging" methods may really be the most economical. There is, however, a possible solution to this problem. If the owners of a number of small deposits in a rather limited area, such as in some of the North Carolina districts, would get together and consolidate their holdings into one company, a unit might be formed strong enough to justify the investment of capital ample for economic operation. Work could then be concentrated on the best deposits, modern machinery installed and a competent manager and technical force employed. A few such units could easily supply the total feldspar demand of the country more cheaply and efficiently than is done today.

Exhaustion of Best Deposits.

Many of the best deposits of feldspar close to lines of transportation have been exhausted, with the result that poorer grades of feldspar near the railroads are being mined and the mining of the higher grades has become more expensive. As a matter of fact large deposits of strictly number one grade in the East are scarce, although by the use of proper methods and equipment, number one feldspar can be produced from some of the lower grade deposits. However, number one feldspar must inevitably command a higher price than it has in the past. As the most easily accessible deposits of number two feldspar become exhausted the consumers must be prepared to pay higher for this grade also.

It has been stated by some that number one feldspar cannot now be had in commercial quantities and that even number two grade, free from objectionable impurities, will not be available in the near future. This is not true, for our available supplies of feldspar, even in the East, are still very large; but better and more expensive methods of mining and preparation must be used and longer hauls will be necessary. When prices attain a certain level, it will be possible to mine and ship feldspar from regions now comparatively inaccessible in Canada and the western States.

Lack of Specifications and Standards

Comparatively few consumers buy their feldspar on specification, and no uniform specifications exist, although from time to time such a system has been suggested. Most consumers make use of a few simple practical tests, but these are not uniform and their value, as far as giving accurate dependable information is concerned, has been seriously questioned. Also, no clear definitions of feldspar grades exist. Number one grade to one potter means practically pure feldspar of the grade known as dental spar, while to another it means a material reasonably free from objectionable impurities such as tourmaline and garnet, but containing as high as 25 per cent of free quartz. Grade names or number, therefore, mean little and consequently price quotations based on such grading are not comparable. Since the feldspar producers have no uniform standards to meet, they cannot be held entirely responsible for unsatisfactory grades of product.

In order to improve this situation producers and consumers should cooperate in setting up uniform specifications and definitions of grades, and in devising simple standard tests, so that the producer can keep an accurate check on his products.

GYPSUM TRADE SPECIFICATIONS

(Editor's Note:— The following specifications are condensed from the Proceedings of the Twenty-Fourth Annual Meeting of the American Society for Testing Materials. They are therein denominated "Tentative Specifications", and, as such, are subject to revision. All of our readers who are interested in gypsum production will find these specifications exceedingly useful.)

I. Materials and Standards

Pure gypsum is calcium sulphate combined in crystalline form with two molecules of water.

No material may be considered gypsum within the meaning of these specifications which contains more than 35.5 per cent. by weight of impurities.

Gypsum may be marketed in any of the following forms and sizes:—

(a) **Run-of-Mine.**— The form in which it comes from mine or quarry.

(b) **Crushed.**— Run-of-mine gypsum reduced to sizes suitable for specific uses. It may be marketed in keted in any of the following sizes:—

No. 1.— Material all passing through a 3-inch ring; not **more** than 30 per cent. passing through a 100-mesh screen, and not **less** than 40 per cent. remaining on a 3/16-inch or equal mesh screen.

No. 2.— Material passing through a 2-inch ring; not **more** than 30 per cent. passing a 100-mesh screen, and not **less** than 10 per cent. remaining on a 3/16-inch or equal mesh screen.

(c) **Ground Gypsum.**— Ground gypsum may be marketted in any of following sizes:—

No. 1.— Material all passing through a 14-mesh sieve, and not **less** than 85 per cent. passing through a 100-mesh sieve.

No. 2.— Material all passing through a 14-mesh sieve, and not **less** than 60 per cent. nor **more** than 85 per cent. passing a 100-mesh sieve.

No. 3.—Material all passing through an 8-inch-mesh sieve, and not **less** than 40 per cent. nor **more** than 60 per cent. passing through a 100-mesh sieve.

II. Sampling

When gypsum is shipped in bulk, samples of about 5 lb. each shall be taken at regular intervals during the complete loading or unloading the carrier, in such a way as to accumulate at least 200 lb. of material. This shall be broken so that **all** will pass a 1-inch ring, thoroughly mixed, and reduced by quartering to provide not less than a one-pound sample for the laboratory.

When gypsum is shipped in packages, at least 3 per cent. of the packages shall be sampled both from the surface and the centre. These samples shall be broken, mixed, and quartered as directed above.

All samples shall be placed immediately in an air-tight container and shipped to the laboratory for test.

The British Empire Steel Corporation, controlling the Dominion Iron & Steel Company, Dominion Coal Company, Nova Scotia Steel & Coal Company and Halifax Shipyards, will move on May 1st to the sixth floor of the new Canada Cement Building on Phillips Square, Montreal.

News of Mining

Platinum deposits have been discovered in Albania, according to official reports. No details are available. The discoveries were made by Professor Sadelerholm, University of Helsingfors.

An encouraging symptom as regards the copper market is the fact that the Calumet and Hecla Mining Company, re-starting operations on April 1st, will mine and mill 2000 tons of ore daily.

Mr. Edgar Rhodes, ex-speaker of the Dominion House of Commons, now president of the British American Nickel Corporation, has returned from a visit to Christiania, Norway. While in Christiania Mr. Rhodes met the Norwegian investors in the Corporation. In a printed interview he spoke optimistically of the results expected from research into possible new uses of nickel. He made no reference to the much-debated recent re-organization.

Late cables from London bring the information that both the **Daily Mail** and the **Daily Express** (Lord Beaverbrook's organ) advise their readers against investing in the Porcupine Davidson gold mine. The Mail expresses the opinion that the vendors should have been satisfied with much smaller share of capital.

During an investigation before a committee of the United States Senate Brigadier-General Amos A. Fries, chief of Chemical Warfare Service, stated that from his experience in France he was convinced that an organic chemical industry is essential to the country's welfare and that it should be protected during development.

The world's production of coal during the year 1921 is estimated at 1,100,000,000 metric tons (2,204 lbs.) as compared with 1,305,000,000 metric tons for the year 1920.

Throughout the majority of United States coal mining districts and those of Western Canada, the miners' strike became affective on April 1st. On the preceding day the first murder due to the strike was committed near Bloomsburg, Pa. There a non-union miner was shot from ambush while he was on his way to work.

At eight of the leading gold mines on the Far East Rand, South Africa, the width of stopes averages 67.5 inches. The waste rock mined ranges from 13.6 per cent to 61.4 per cent, averaging 55.7 per cent. Vein matter varies in thickness from 11 to 41 inches, averaging 30 inches. The reasons addduced for this high proportion of waste are the flat character of many deposits, the lack of hand drill labour, and the occurrence of natural bedding planes.

European Russia is credited with an output of 1,950,000 tons of petroleum during the first half of 1921. This is less than half the production of the corresponding period of 1915. Production is steadily declining under Soviet control.

The United States Bureau of Statistics, in its monthly report, notes that the February average of metal prices was 23.8 per cent under the average of all other commodities. For only one month in the last two years has any group of commodities been lower in price than metals.

The subject of a duty on imported magnesite is still being debated by a United States Senate Committee. Steel producers are stated to have urged maximum duties of $5 and $3.75 per ton on grain and crude magnesite respectively, whereas the Fordney bill provides duties of $15 to $7.50 per ton.

Before the war there was some slight activity in gold mining in France, more particularly in the Limousin and Plateau Central districts. At present all active operations have ceased.

Graphite production during the year 1921 was less than at any time since 1902, the world's estimated total being 85,000 metric tons as against 100,000 metric tons during 1920. Canada's output was almost negligible. Ceylon's exports (4,422 metric tons) were only a fraction of pre-war tonnages. Korea held its own with exports of 11,000 tons. Mexico exports 3,088 tons, almost a normal amount. Germany, alone, forged ahead with a production of 30,000 tons or 50 per cent more than unofficial returns for 1920. Shipments of 15,000 tons on consignment from Madagascar during 1920, helped to bring on the present slump.

Fluorspar production in the United States during the year 1921, fell 85 per cent. in value and 81 per cent. in quantity. Shipments amounted to 35,600 tons, valued at $708,000. Imports amounted to only 6,229 tons.

During the year 1921 there were 745 fatalities in coal mines in the United Kingdom, 12 fatalities in metalliferous mines and 46 in quarries. All of these figures were lower than the corresponding totals for the year 1920, which were, respectively, 1,103, 27, and 51. Of the 745 deaths in colliery accidents, 378 were attributed to falls of ground, 250 to miscellaneous underground, 72 to surface accidents, 26 to shaft accidents, and 19 to explosions of fire damp or coaldust. In the underground deaths 116 were caused by trains or tubs.

The disastrous effects of the strike habit are illustrated by the recent history of the Sulphide Corporation, Broken Hill, New South Wales. Before the war the normal output was 200,000 tons per year. Strikes during 1916 brought the output down to 182,000 tons, in 1917 to 167,000, in 1918 to 123,000 tons, in 1919 to 113,000 tons, in 1920 to nothing, and in 1921 to only 62,119 tons. Since the year 1916 the cost per ton of lead concentrates produced have risen from £6 19s. to £12 9s. 6d.

English buyers of tungsten ores have been confronted upon 60 per cent. tungsten material. WO$_3$ as a premium and have the option of up to 4 per unit. Higher prices are paid for 70 per cent. tungsten trioxide, dry, with the extra 2 per unit. Manganese not over 10 per cent. and phosphorus not over 0.01 per cent. Molybdenite must be brought up to a basis of 85 per cent. molybdenum sulphide. Most [illegible]

per cent. Some Chinese ore runs as high as 96 per cent. molybdenum sulphide.

The New York Journal of Commerce estimates that the United Mine Workers receive about $25,000,000 a year of dues deducted from the pay envelopes of miners; and suggests that if Congress investigate the coal mining situation it should enact legislation against involuntary membership in unions and should compel all unions to account for the money they spend.

United States coke production figures for the year 1921 show the strong position occupied by by-product ovens as compared with bee-hive ovens. By-product ovens produced 19,918,000 tons of coke, bee-hive ovens only 5,501,000 tons. The figures for 1920 were, respectively, 30,000,000 tons and 20,000,000 tons. Bee-hive outputs were less than in any year since 1885, while by-product output was greater than that of any year preceding 1917. The full annual capacity of present by-product installations is 44,275,000 tons. 85 per cent. to 90 per cent. of the figure represents actual working maximum.

A campaign for the reorganization of the Sicilian sulphur-mine industry is well under way. Two-thirds of the mines are owned by the Anglo-Sicilian Company. At these there is noticeable improvement. Large reserve stocks, low prices and indifferent labour are the prime causes of the present slump.

The Chile Copper Company, Chuquicamata, Chile, possesses larger ore reserves than any other copper mining company in the world. Its estimated and probable ore is repoted as follows: 326,300,000 tons of oxidized ore, 1.91 per cent. copper; 151,000,000 tons of mixed ore, 2.98 per cent. copper; and 210,000,000 tons of sulphide ore, 1.84 per cent. copper. Its monthly output is about 4,000,000 lbs. of copper.

Making the Labour Union Responsible for Production

(Abstract specially prepared for Canadian Mining Journal.)

In the March 18th number of "The Industrial Digest", Mr. T. M. Ave-Lallemant discusses very lucidly the question of the relation between employers and trade unions. The issue of collective bargaining, he states, must be settled on the basis of principles acceptable to society generally.

In their attitude towards unions, employers have the choice of four alternatives. They may discourage the unions, and, if possible, destroy them; they may disregard them; they may deal with them as they are; they may co-operate with them to bring about needed reforms.

Even if, as in England, labor unions were recognized, legally-constituted bodies, their position would still be dubious. American employers do not recognize the working men's right to bargain collectively. Labour is still regarded as a commodity. To many employers the so-called "open-shop movement" aims not only at a refusal to deal with labour organizations, but also at purely individual bargains. Other employers prefer to deal with their employees through shop committees or works councils.

But destruction of the union has not been achieved. It probably never will. So long as they remain they cannot be successfully disregarded. Their partieipation in wage settlements is, therefoe, essential to industrial peace and economical production.

The Open Shop Issue

Dropping all cant, let us see what the open or closed-shop issue really amounts to. Employers say that the unions, by insisting upon a "closed" shop, limit the freedom of workers as well as of employers to make such contracts as they please to make. The answer is that collective agreements **necessarily** limit freedom of contract; for the collective agreement stipulates that individual contracts made thereafter shall conform to certain terms defined in the agreement. If the agreement provides that the employer shall pay not less than the union scale of wages, then the "open shop" can mean only one of two things:— Either that the employer has no dealings with the unions, though some of his employees may be union men; or, that the employer makes an agreement with the union that does not bind him to apply given terms to all employees of a certain trade, but leaves him free to employ as many workers as he sees fit to whom the terms of the agreement shall not apply.

But a trade agreement that does not apply to non-union and union workers alike is of no value to the union or to its members. The union contends that since all benefit by its agreements, all should bear its burdens by becoming members.

"Soldiering" a Common Practice

The second major objection to the union, the charge that they instruct their members to limit their individual outputs, is made even by those employers that deal with them. The charge cannot be denied; but we have no present means of knowing how generally such restriction is practiced. Only better economic organization will do away with this custom.

Most trade agreements are, in the main, wage settlements, and do not generally fix definite standards as to the quantity and quality of work to be done. It is still left to the employer or to his foreman to get as much and as good work as be can out of the men. It is a question open to debate who has done more to break down the standards of quality in workmanship—the careless and poorly trained workmen, or the manufacturers of the "just as good" product.

If an agreement stipulates a time-wage, the faster workman has no inducement to do better than the average, the manufacturer's income is reduced, and the unions themselves are reacted against. Employers, therefore, have demanded agreements that stipulate payment by results. But the piece-rate system is the crudest of all methods of paymnt by results. It cannot fix either quantity or quality. It is unsatisfactory to both unions and employers.

The Real Solution

The step now holding real promise of progress toward a peaceful settlement, is the collective labour contract. This does not mean a trade agreement. Trade agreements are not enforceable contracts. They merely imply as many individual contracts as there are workmen employed. The collective contract is an enforceable contract between an employer and a group of workmen who undertake to produce a quantity of a finished product within a certain time and for a fixed amount of money. The price to be paid for a given quantity of work within a fixed period is agreed upon. Results only are paid for, and there is no motive to limit production.

This has been done in a sufficient number of instances and on a sufficient scale to prove that the plan is practicable.

News and Comments

By ALEXANDER GRAY

The Story of Minerals Separation

One of those mental lapses which are inevitable, even if inexcusable, made me state that the late John Ballot was associated with Claude Vautin in the earlier stages of the Minerals Separation development. Vautin and his work were in my mind at the time, so I would correct my error and in doing so tell the story of who was John Ballot and how he accomplished his great work in the metals world.

Mr. John Ballot was born in Cape Colony, British South Africa, in 1861. Before leaving South Africa for England in 1895 he engaged in various mining and metallurgical ventures.

The Elmore oil-rafting process became known in England about 1899, and Mr. Ballot in 1900–1901 carefully studied this process, and in association with Mr. W. W. Webster and others took an option on the Australian rights, which option expired in October, 1902, without being exercised.

About this time, Mr. A. E. Cattermole discovered his agglutinating or granulation process. Mr. Ballot became interested in this latest development of oil concentration, and organized the Cattermole Ore Concentrating Syndicate in London in 1903.

It was during the investigation for the cheapening of this process that in March, 1905, he was associated with Messrs. H. L. Sulman and H. F. K. Picard in the invention of the air-froth flotation process of ore concentration which has since revolutionized ore-dressing methods in all parts of the world.

This process was patented in England in 1905 and in the United States of America in November 1906, and has been the foundation for world wide litigation between Minerals Separation, Limited, of London, Minerals Separation American Syndicate (1913) Limited, the Sulphide Corporation (Australia), and Minerals Separation North America Corporation, on the one hand, and the Ore Concentration Company, Limited (holders of the Elmore process patent rights), James M. Hyde, the Butte & Superior Mining Company, Miami Copper Company, Utah Copper Company, Nevada Consolidated Copper Company, Chino Copper Company, Ray Consolidated Copper Company, Magma Copper Company, and others on the other hand.

Mr. Ballot, as Chairman of the Board of Directors of Minerals Separation, Limited, was largely instrumental in defending their interests in long and expensive litigation in the British and Australian courts. This litigation was decided in favor of Minerals Separation, Limited, in the House of Lords (the final Court of Appeal of England) and the Privy Council (the final Court of Appeal for British Dominions Across the Seas).

Mr. Ballot was President of Minerals Separation North American Corporation from the day of its incorporation in 1916 until his death on April 1, 1922. He largely directed the American litigation and the Minerals Separation companies received sweeping decisions in the opinions rendered by the United States Supreme Court in both the Hyde and the Butte & Superior cases. These decisions are considered by the metallurgical profession to the most important since the famous McArthur Forrest cases. In the first suit his patent was declared valid and infringed, and in the second the limit of the patent was defined. This patent was again considered in the Miami case in the Federal District Court for the District of Delaware and the United States Circuit Court of Appeals for the Third Circuit, together with two later patents (U. S. 962678 and 1099699). Decisions in these cases were in favor of Mineral Separation and were not appealed to the United States Supreme Court.

Litigation in the various other cases is progressing.

Mr. Ballot's efforts in inventing, applying and introducing the flotation process to the metallurgical industry in all parts of the world conferred an inestimable boon to mankind, which will be remembered for many generations.

The Oil Complex

One half the Oil World wishes it did not know how the other half is over-producing. Speculators and large vested interests are perfervid in their desire for curtailment, or for confirmation of their expectations that Mexico cannot maintain its pace. General Director Deterding of the Royal Dutch Company protests against insensate over-production when the demand for enormous quantities does not exist. As a consequence of this, the price situation cannot be rectified. Producers find themselves in a position from which refiners will not extricate them. In the long run the race will be to the strong who are protecting their production by acquiring great areas. Meanwhile the small fry cannot agree with the Deterding view. They have to sell oil, even if dividends are paid out of capital. Yet Sir Henry W. A. Deterding is not a factor to be lightly disregarded.

Newfoundland-Labrador Enterprises

It is said the Armstrong Whitworth plans for developing Newfoundland water powers, forests, and mineral areas, have undergone a change, if they have not been altogether abandoned, owing to the pulp areas large enough to meet their requirements. There was to be lumbering, pulp and paper making, diversification of the government to make concessions for coal mining, on a broad front, but the aid sought from the Government, it is alleged, is not forthcoming. Meanwhile the British Metals people are said to be drilling in Labrador in the vicinity of Gull Pond, about fourteen miles inland from Little Bay. Already two holes were put down at Little Bay, to a depth of about 1600 feet. Then the drill was moved to Gull Pond.

Washington's Affection for Canada

The so-called Fordney tariff, fearfully and wonderfully contrived, is convincing proof of the determination to exclude what will compel [illegible] essential crude materials and minerals. Senator Lafollette has the temerity to intimate the Fordney Bill (there is doubt as to its parentage [illegible]). No doubt it is untamed. [illegible] speed limits in its amending schedules. [illegible] that copper ore from ore coal [illegible]

precious metals bullion will be admitted free. A levy of 2½ cents a lb. on copper and 3 cents to 25 per cent. on nickel, are exhibitions of "love spats" seemingly on the assumption that the cats of Kilkenny had the right idea—the more "spats", the more cats. But they must be American cats!

Gold and silver bullion is not going to be outlawed in any degree. Refined copper and nickel are prejudiced, along with the products of Canadian iron ores. With the imposts upon farm staples and cattle, certain pulps, aluminum, etc., even the occupants of the tombs of the Pharaohs will see that Brotherly Love is rampant across the border. Advocates of Reciprocity will appreciate the more how Washington dissembles its love and throws us down stairs.

Not much has been overlooked by the tariff-smiths on behalf of professedly decrepit industries and interests of a country that has the overwhelming portion of the world's liquid capital, and a paltry $1,000,000,000 in gold. However, as "commerce is war", Canada will have to shape its course accordingly, and stop being too submissive—or is "supine" a better word? Of course asbestos is unmolested, and mattes may be exempt. Maybe the last has not been heard of the changes; for the graphite producers of Alabama are perturbed and tearful about competition from Mexico, Madagascar, Ceylon and Canada. First on the alphabetical roll of States, Alabama considers itself last in the line of preferment. Its iron and coal are shielded, but its graphite is positively solar-plexused unless it receives the first-aid sought. Without a tariff the industry cannot evade sleeping sickness or locomotor ataxia, though a rude person named Schnell publicly asserts that what Alabama most needs is quality production. To that end Mr. Schnell proposes that Alabama producers "get down to hard work and study to make it possible to compete with the foreign product".

Kirkland Lake Gold Mines

The surplus on operations of $13,015 reported by Kirkland Lake Gold Mining Company for 1921, is nothing to cherish as an heirloom. Evidently the grade of the 25,715 tons treated for a production of $147,654, made the $5.73 average recovery per ton. While latest developments are represented to be very encouraging and extensive development is planned, the explanation that "much ore is tied up on account of a possible rock slide", hardly suffices, without details. However, the fact that a great deal of money belonging to parent organizations has gone into this property makes it necessary to have the hopes of the management sustained. President Culver hung up a picture of what is below the 700 foot level; a shaft is going down to 1,900 feet, and Kirkland Lake Gold may be more prosperous than it has been.

Fooling With Our Feldspars

That the feldspars constitute the most important of rock-forming minerals is not fully realized by even the scientifically initiated. That Canadian feldspars are going to mean more and more in our national economy is less thought of than is at all wholesome or profitable. Hence the comment of the **Engineering and Mining Journal-Press** upon the latest Canadian figures on the production of those minerals is useful to emphasize our prevalent disregard of their potentialities.

The Journal-Press is complimentary to Canadian producers for the "creditable" showing made, the tonnage mined being 33,597. But agony enters when it is stated that "slightly more than 2,000 tons was milled", although "shipments, all from Ontario and Quebec, totalled 30,540 tons, valued at $223,000, an average of $7.31 a ton. Of this all but 200 tons was sold in the crude form".

The sting is in the tail of the comment. The remedy and the reason therefor is set forth in this way: "Canadian feldspar has been in considerable demand in the United States in recent years, and the erection of further grinding plants in Canada will permit of the export of Canadian feldspar at a much higher price than is now obtainable for the crude product. One new grinding plant has been opened during the year (1921), and "**Canadian producers are apparently fully alive to the desirability of preparing the Canadian product in its most valuable form**".

Under the circumstances, the words are worth the italics. It is a bit dubious to have it said we are "apparently fully alive"; but we should be grateful for the suggestion that the feldspars are amenable to more "valuable" exploitation. The trouble is "one new grinding plant" savors of the "one swallow" that "does not make a summer".

How About Lead?

What was the idea the other day when it was proposed at Spokane that Canadian lead be accorded certain privileges of entry into the States? Those present endorsed the position taken by one of the United States Senators against penalizing Canadian lead in pending tariff legislation. They want lead, and British Columbia has it. But, "in the twinkling of an eye", there is jubilation among American zinc producers, to the accompaniment of "rag time", owing to the announcement that a duty of 2 cents a lb. is to be imposed upon imported zinc. The historic game of "what's-yours-is-mine-and-what's-mine-is-my-own" must be applied both ways, unless Washington's philanthropic policy of assimilation is made fully reciprocal at Ottawa.

Bancroft Redivivus

Unmixed pleasure—downright merriment—accompanies the announcement of THE MONTREAL GAZETTE that Professor Joseph Austen Bancroft, A. M., F. R. S. C., F. G. S. A, "used to be a well-known and popular figure at McGill University", and that the veteran geologist will soon resume his work. As a "past tense" Professor who went into strenous "retreat" nearly a whole year ago, those who recall him will have no regrets at his return. To his attainments as Dawson professor of Geology he has added the knowledge acquired as Assistant General Manager of the Granby Consolidated Mining, Smelting & Power Company, at Anyox. So the hiatus of almost twelve months could not have permanently impaired his former popularity and scholastic ability.

Cobalt Magnet Steel

Sheffield put nickel on the metals market. Now it is taking a hand with cobalt. The discovery of "cobalt magnet steel" is hailed with great éclat in London. "The construction of telephones and the making of motor car and aeroplane engines is likely to be revolutionized."

This will provide Canada with another chance to export raw materials. We are specialists in exporting raw material. Now we may be able to ship our superabundant smaltite. Yet our exports are not confined to raw materials; we export finished scientists, because they are encumbrances hereabout. **(vide Mr. Meighen).**

British Columbia Letter

Activity in Yukon

Much development and general activity is expected this year in the Mayo Camp, near Dawson Y. T. The silver fields of this section of the Yukon have been looking better every year since their discovery. The results of last year's operations, satisfactory in every respect, led to the prediction that hundreds, if not thousands, of newcomers would pass through Dawson en route to the new mining Mecca of the North during the summer of 1922. These prophesies promise to be realized. Every northbound steamer from Seattle, Vancouver and Victoria in recent weeks has taken many passengers and much freight destined for Mayo. It would seem that Keno City, and perhaps other "cities" of the locality, are destined to grow, that they have an assured future, and that the former at least may become as famed and widely known as is Dawson, the centre of the golden Yukon.

Operations have been in progress on the established properties of Mayo during the winter, hundreds of tons of ore have been transported over the snow to the riverside ready for shipment south, and, with the promise of early opening of navigation, vessels are beginning to take in supplies for the miners already on the ground and those who are going there. The freight is being rushed in over the winter trail as, for a time after the thaw commences, the roads and trails, such as they are, are very soft and difficult.

In point of authoritative information regarding mining conditions generally in the Yukon an article appearing recently in the "Dawson News" by George P. Mackenzie, Gold Commissioner for the Yukon, is of interest. He says in part:

"During the war and for some time after, mining supplies, especially dredging parts, were practically out of the market, and, when procurable, the prices were so high as to be prohibitive. There is now a marked improvement in this connection which is being reflected in increased activity in dredging operations.

"The cold water thawing process referred to in my last review has proved a complete success. The substantial reduction in the cost of thawing operations by this method brings within the field of profitable operation very large areas of gravels which will not pay to dredge if thawed by steam.

"The summer of 1921 was an exceptionally dry season. The consequent shortage of water appreciably reduced the normal output from hydraulic mining operations. Notwithstanding this, however, the gold output for the year was in excess of that for 1920.

"At least three new placer gold discoveries of importance were made during 1921. The result of Keystone drilling operations on Russell creek, a tributary of the McMillan river, has been so satisfactory that the parties interested have arranged for further development work to be done in 1922, and feel confident that they have valuable dredging ground in that district. A new line of high grade and possibly extensive pay also has been opened on Miller creek. Rich pay also has been discovered on Allgold creek, on a portion of the creek not formerly prospected, and it is confidently expected that this creek will now become a substantial producer.

"Extensive development work was done during 1921 on the silver-lead properties in the Mayo district. The results of this work, I believe, justify the statements now made by competent mining men, that Yukon has in this district one of the richest and most extensive mining areas in the world.

"During the winter of 1920-1921, the Keno Hill, Limited, mined and hauled to Mayo over 2,300 tons of high grade ore, which was shipped to the smelter during the summer. This company has increased its holdings, has kept employed a large force of men during the summer in development work.

"F. W. Bradley, one of the best and most favorably known mining men in American, has acquired extensive holdings in the district, has erected permanent and substantial buildings, and has a large force of men at work developing his property which shows great promise.

"The Slate Creek Mining Co. also has acquired a large group of claims, and is doing extensive development work.

"Smaller concerns and individuals also are busy opening up their properties.

"Some of the pressing needs of this promising district referred to in my last review have been met. A free government assay office was provided in the heart of the district and has been much patronized and appreciated by the prospectors. With the very substantial and generous assistance of the Keno Hill Limited, and the F. W. Bradley interests, a good wagon road has been completed by the government from Mayo to Keno Hill, approximately forty miles. However, additional roads are needed.

"Perhaps the most pressing requirement of the Mayo district at the present time is telephone or telegraph communication with Dawson or some other point that has communication with Dawson and the outside world by telegraph. Every effort is being made to secure this communication, and it is confidently hoped that arrangements to this end will be perfected during the coming summer.

"In the south end of the territory there is increased activity in lode mining, especially in the Wheaton district. There is every reason to believe that this part of the terriory is about to experience an unprecedented development of its rich and extensive mineral resources.

"Present conditions surrounding the industry are in the main satisfactory. At no time in the history of the territory have the people generally been so optimistic for the future, and in my own opinion this optimism is justified by the facts."

The Cedar Creek Rush

It is estimated that 2,000 prospectors will pass through Williams Lake Station en route to the new Cariboo gold fields this spring. There is considerable excitement in Vancouver, Victoria and other coast cities. Blue prints of the Cedar Creek and Quesnelle sections are finding a ready sale at substantial prices. The hardware stores have run out of their supplies of gold pans and the management of the Pacific Great Eastern Ry. is figuring on the additional transportation facilities necessary to handle the men and supplies that will have to be taken to the interior during the next few months. A considerable number already have started for the hills, but the rush will not commence before the middle of May or early in June, when the snow will have gone as to permit work. At Williams Lake, Quesnelle

Forks and other centres, temporary buildings are being erected to take care of the living requirements of the stampeders for gold, in fact all through that part of the country there are signs of an incipient boom. Cedar Creek is a small turbulent stream draining into Quesnelle Lake and "Discovery" is a little north of the 52nd parallel of latitude, and about fifteen miles by road and trail from the settlement of Quesnelle Forks. The strike was made about 250 yards from the creek bed in an old channel and the deposit is supposed to be due to glacial action and to be very rich in spots. Whether it will prove to be a case of "many are called and few chosen" remains to be seen, but even if the field is badly spotted the entire district will be carefully prospected.

Washing Gold on Fraser River.

Gold is being washed out along the bars of the Fraser River this spring, the water being lower by two feet than it has been for many years. A number of Indians operating near Pavilion B. C. are reported to have cleaned up over $100 a day over a period of some weeks. This practice of panning gold from the river banks in the spring time has been in vogue since the early days. The season for work as a rule is short as the river rises rapidly with the melting of the snow on the benches above, the bars are submerged and further placer work is impossible.

North Star

The North Star Consolidated Group of Claims, situated on the British Columbia coast 105 miles from Vancouver ,has been purchased from J. D. Black by J. D. Hancock, who expects to be shipping ore to the Anyox smelter within a month. There is a 10 ft. vein on the property carrying argentiferous galena the lead and silver of which is said to average $175 a ton.

Pat Daly, mine owner and operator of the Portland Canal District, who has been spending the winter in Seattle and Spokane, has returned to Stewart, B.C.

S. P. Fitzgerald, one of the owners of the Independence Group, Bear River Section, Portland Canal, is making good progress in development. He recently brought to Stewart some good samples assaying $26.50 in values (gold, silver and lead.)

The reconstruction of the Bear River bridge has started and a wharf is being built at Hyder, Alaska.

Frederick Keffer, mining engineer of Spokane, Wn., has been engaged recently in the inspection of the Riverside Mine, situated a few miles north of Rock Creek, B.C. This is the property of the Jack Paul Mining Co., of Spokane Wn. Paul Nelson has had charge of operations for some time and it is the Company's intention to do considerable development this year.

High grade ore has been opened up on the St. Paul Group, east of Vernon B.C. Gold and silver values are said to run better than $50 a ton. A 300 foot tunnel has been driven parallel to the vein. There is a stream near the property capable of developing 300 horse power. It is reported that the company is figuring on an electric plant for the treatment of the ore. It is being perfected in Spokane and, if it proves to be practical, will effect considerable economy in the handling of the product of the mine.

The Vendela, Hidden Load, and Silva Claims, situated about a mile southwest of Greenwood, B.C., have been bonded to H. McGillvray, H. M. Stramberg and associates. A tunnel will be driven to test the ore at depth. Showings as far as developed run high in copper and carry gold and silver values.

Ore shipments received at the Trail Smelter of the Consolidated Mining and Smelting Co. for the week from the 8th to the 14th of March inclusive totalled 13,168 tons, making the aggregate for the year 123,442 tons. Of the week's receipts 13,151 tons came from the company mines and 11 tons from the Ottawa Mine,Sloean.

New Development Company

The Inter-Provincial Mines Development Company has been organized in Vancouver, B.C. with a capitalization of $500,000. The managing director is T. H. Kerruish, a well-known British Columbia mine operator and prospector, with whom is associated, among others, Mr. John Pedersen, a prospector and mining man with a large circle of acquaintances. The Company has taken over the old Tecumseh Mine, now known as the Nip and Tuck and Silver Tip, on which there is silver lead ore of good grade, several shipments having been made which netted over $70 a ton. There are several veins as yet practically unexplored which show high grade ore on the surface, one shoot giving average values of over $150 a ton in silver and lead. Mr. Kerruish states that it is the intention to take over properties that may appeal to the directors as being good business propositions from the standpoint of the practical miner. He thinks that there are many such offerings in British Columbia and that all that is necessary for their selection is a knowledge of the business.

Geological Survey Parties

Dr. M. Y. Williams professor of palaeontology and stratigraphy in the University of British Columbia, has been appointed to take charge of a Dominion Geological Survey Party which will start from Edmonton, Alberta, in a few weeks to work along the Mackenzie River from Wrigley to Fort Norman. He will enter the Mackenzie River valley by a route that has never before been traveled by a geologist. Dr. Williams will set out from Edmonton in the company of Dr. G. S. Hume, who is heading another Dominion Geological Survey Party. Together they will journey to Fort St. John by rail and power boat, thence by pack train and canoes to the headwaters of the Nelson river, and thence to the Liard River and the Mackenzie. This will take them to Wrigley. The route was thoroughly explored last year by Inspector Marraway of the Topographical Survey of the Department of the Interior, caches of supplies and general necessities being left along the trail. With headquarters at Wrigley, geological explorations will be carried on, special attention being given to the country along the east side of the Mackenzie, which is comparatively little known. Dr. Hume's party will be one of the first to make Fort Norman after the river opens, and his season's work will be confined to the district adjoining Fort Norman to the north. Dr. Williams, who is one of the foremost Canadian authorities on oil geology, joined the faculty of the University of B. C. a little more than a year ago after two years' experience as professor at Yale. He is a Fellow of the Geological Society of America.

Preparing for Rush to Cedar Creek.

The Provincial Government, recognizing that a rush to the Cedar Creek section of the Cariboo District, will take place as soon as the snow disappears, is taking steps to provide adequate facilities for the recording of placer or mineral claims. There now is a Recorder at the 150 Mile House, Cariboo Road. This is some ten or fifteen miles out of the line of travel from Williams

Lake to Cedar Creek and, also, is not on the route to the Whitewater Country where gold has been discovered and to which there will be a moderate stampede, judging from present indications. For these reasons the boundary of the present Quesnelle Mining Division has been extended a short distance southward to take in Williams Lake Station, Pacific Great Eastern Railway. The Mining Recorder will be transferred from the 150 Mile House to this Station. The change will permit him to carry out his duties of Recorder for the Quesnelle Division, wherein is Cedar Creek, and Sub-Recorder for Clinton Division, in which is located the Whitewater, with the maximum of convenience to the prospectors and mining men.

Williams Lake Station is the "jumping off" point for both the new placer fields. Westerly trails lead into the Taseko (Whitewater) basin where excitement has been created by the reported richness of claims situated on Iron Creek. This route perhaps is circuitous but is likely to be opened sooner than Warner and other passes. It is understood that it has been surveyed by engineers of the Public Works Department and that, if developments warrant the expenditure, a road will be constructed into the Whitewater which, aside from its mineral possibilities, is known to be a magnificent stretch of open park-like country offering wonderful possibilities agriculturally. Northerly the trails lead into the Quesnelle Lake and Cedar Creek District. The country here, too, is open, the roads and trails under normal conditions good, and there should be no difficulty for the type of man who will be tempted by the adventure of a "gold rush" to reach "the diggings." Neither of the two "fields" that are attracting attention in British Columbia are hard to get at, there will be none of the hardship that attended the stampede to the Klondyke, although there may be some inconvenience, if the influx develops into a flood as now seems possible, because of delay in getting in sufficient supplies. It would appear, however, that the requirements of the miners will be well taken care of as to Mining Recorders. They will have, in addition to the official at Williams Lake, a sub recorder at Quesnelle Forks, only a few miles from Cedar Creek, and the Gold Commissioner at Barkerville.

The British Alaskan Mines Ltd. has been incorporated to develop the Benson Claims situated on Fish Creek on the Alaskan side of the boundary in the Portland Canal District.

The Esperanza Mine, Alice Arm, has shipped 90 tons of ore to the Anyox Smelter, Granby Consolidated Mining and Smelting Co. High grade ore is to be sent to the Tacoma Smelter for treatment.

Considerable work has been done on the Black Diamond Group of Mineral Claims, Clearwater Creek, upper Kitsault River, Alice Arm. A 32 foot vein has been under development and assay returns have shown satisfactory values in gold and silver.

The first shipment of concentrate from the Tidewater Copper Company, Sidney Inlet, to the Tacoma Smelter since the resumption of work was made a few days ago. It consisted of about 100 tons running about 10 per cent copper. About 250 tons will be shipped every 20 days hereafter. Up to the present the Mill has been operated at only about half capacity because of lack of power, cold weather holding the snow in the hills and thus causing a water shortage.

E.H. Parsons, smelter superintendent of the Granby Consolidated Mining & Smelting Co., has been studying conditions at the Trail, Anaconda and other large smelting centres.

C. S. Baker and associates have taken a three year lease on the Kansas Group, American Creek, and will start development at once.

Harrison E. Moore, of San Francisco, has been inspecting placer ground on Goldstream, Big Bend District, near Revelstoke. He is reported to have secured extensive leases in this district and to propose operating on an extensive scale during the 1922 season.

A tremendous snow slide has cut off the Queen Bess Mine, at which seven persons are employed. Telephone connection with Alamo, where J. Cunningham, the owner, resides, has been established and it is found that there are six months' supplies at the Mine. The slide, one of the greatest known to old timers in that part of the Province, carried away four towers and a mile of heavy cable.

J. T. Smith, of New York, is organizing a party to prospect the upper waters of the Peace River for gold next summer. Mr. Smith thinks that the Company which is placing a large suction dredge on the Peace has one of the best propositions in Canada. Operation of a similar plant on the Erie Canal in the United States cost less than 15 cents per yard and the same work on the Peace should be done for seven or eight cents. That there is pay ground on the river he feels confident. Miners working on the river bars near Hudson's Hope made at much as $20 a day when the river was low.

The Standard Silver-Lead Mining Company, in its report for the quarter ending December 31 last, shows a surplus of $111,710. In addition the Company has paid dividends amounting to $2,700,000 and invested substantial sums in the development of the property. The property now has passed into other hands on a bond and lease.

The Board of Directors of the Cork Province Mines, at a meeting held recently at Kaslo, B.C., decided that active mining would be resumed as soon as the snow leaves.

Reports are in circulation that a newly incorporated Company, known as the Consolidated Bullion Hydraulic Mining Co., proposes reopening the old Bullion Workings, Cariboo in the near future. This is the property that was exploited on a considerable scale by the late J. B. Hobson and over which there has since been much litigation, the right to title as between Ward and Hopp being carried to the Privy Council whose the former was successful. The investment of Mr. Hobson and his associates in plant and general equipment was substantial and their operations resulted in some good clean-ups. The new owners it is understood believe that there is scope for profitable work in these parts of the ground that remain untouched.

GOLDFIELD

At the Porter property at Goldfield, Ontario, a stamping plant has been installed and mining development [illegible] this year. Owing to the promising [illegible] of the property there is current interest attached to prospecting in the area and considerable activity [illegible] doubtless be carried on [illegible]

Northern Ontario Letter

The Power Situation

While officials of the Northern Canada Power Company claim that the power development now under way will provide for the requirements for the gold mines from now on, officials of the Hollinger Consolidated have expressed the opinion that this will not be the case. The Hollinger is accordingly negotiating with the Ontario Government for the right to develop energy on the Abitibi River. The T. and N. O. Railway Commission is taking every precaution to retain control of the power rights that will eventually be necessary to electrify the line. At the same time, the Commissioners have gone on record as stating that there is sufficient energy on the Abitibi for all three concerns, namely, the T. and N. O. Railway, the Hollinger Mine and the Abitibi Power and Paper Company. It is believed, therefore, that whatever steps the Hollinger considers necessary will be undertaken at the convenience of that company.

Dome's New Record

Production from the Dome Mines reached a new high record in March, when upwards of $311,000 in bullion was turned out. This makes a total of over $918,000 for the first three months of the year. After adding interest on bonds and loans, plus premium on gold sold at par with United States currency, it is obvious that the total income for the three months was between $950,000 and $1,000,000. The amount of ore being handled averages about 1,000 tons daily and the average recovery is about $10 per ton. No statement of costs has been made, but on this grade of ore it may be estimated at over $4 per ton. However, allowing liberal margin, it is probable that the net profits for the three months ended March 31st amounted to about $500,000, or actually at the rate of $2,000,000 a year. This net profit is at the rate of 42 p.c. on the company's issued capital.

McIntyre

A rich strike is reported to have been made at depth on the McIntyre-Porcupine, although no official statement could be secured up to the time of writing. The McIntyre is working at the deepest level so far reached by any gold mine in Northern Ontario and the report of high-grade ore carries great importance. The General Manager, R. J. Ennis, stated to the Journal correspondent some weeks ago that the geological structure at a depth of 1,875 feet was such as to encourage the belief that the favorable results obtained at from 1000 to 1375 feet would be found to continue to greater depth.

Porcupine V. N. T.

Power is now available, and the Porcupine V. N. T. will proceed at once with an extensive development program. The present 600-ft. shaft will be continued to 900 feet deep. A cross cut will be made to the vein at 750 and 900 ft. at which points lateral operations will be undertaken. With evidence at the leading mines that the mineralization increases with depth, the operators of the Porcupine V. N. T are optimistic in regard to the result of work planned on this mine. The question of placing the mill in shape for operation will be considered when the development work is well advanced.

Gold and Platinum in McArthur Tp.

Assays from claims staked in McArthur township, about twenty miles south from Porcupine, show a gold content of from $3 to $41 and from $2 to$7 in platinum. These samples were "picked", it is understood, but the result is much as to direct attention to that promissing area.

Sinking on Goldale

The Lewisohn interests are proceeding with their plans to develop the Goldale properties in the Porcupine district. Harry Kee, manager of the Kerr Lake mine of Cobalt, is in charge of the work, and an aggressive scheme of exploration has been mapped out. Sinking operations will be undertaken on that part of the property lying at the east end of Pearl Lake, while diamond drilling operations will be undertaken at a later date, from these underground workings.

Hollinger Output

It has been learned officially by the Journal correspondent that an error got through the press some weeks ago in which the Hollinger was shown to have treated 4,700 tons of ore daily. This was due to a a stenographer at the Hollinger making a typographical error, making the statement show 4,700 instead of 3,700. The error was quickly found and corrected at the mine, but a press representative who was hot on the trail for information, secured the figures before they were corrected, hence the widespread error through the press.

Many Claims Recorded

As a result of the staking in the eastern part of the Kirkland Lake gold area well as in the "placer" district south of Abitibi Lake, the recorder for the Larder Lake Mining Division has recorded 854 mining claims during the first three months of the current year. This compares with a total of about 850 during the whole of 1921 and goes to show the extent of the growing interest in the mining areas. This information was secured officially from Mr. Watson, Department of Mines representative at the Department's North Bay branch.

Tough-Oakes

The Tough-Oakes mill of the Kirkland Lake Proprietary, which went into operation on Monday is giving good satisfaction. The whole of the plant, including the new rock-breaking installation, is running smoothly according to official advice to the Journal.

This makes a total of five regular gold producers in the Kirkland Lake district, where an aggregate of approximately 650 tons of ore is being treated daily, with a gross production of close to a quarter of a million dollars a month.

Orr and Teck-Hughes

Officials of hte Orr Gold Mines held a recent conference in New York with official of the Teck-Hughes Gold Mines. The inference taken from this in local mining circles is that either the sale of the Orr mine, or a consolidation is under consideration. The Orr property would be a valuable addition to the Teck-Hughes for the reason that the dip of the ore bodies is to the south and into the Orr property.

Lebel Lode

Directors of the Lebel Lode authorized the purchase of the adjoining La Presle claims. This will give the company about three quarters of a mile of the vein system in evidence on the Lebel Lode.

Argonaut

The shaft on the Argonaut Gold having reached a depth of 500 feet, and the work of equipping the mine with a mill being well under way, this enterprise is on a fair road to occupying a place with the producing gold mines.

Blue Quartz

At the 100-ft. level of the Blue Quartz property in the Painkiller Lake district, the vein has widened to over two feet and contains considerable visible gold. The vein material is being bagged preparatory to making a shipment at an early date.

Beaver

In the annual statement of the Beaver Consolidated, a credit balance of $944,493.66 is shown. This is made up largely of investment in the Kirkland Lake Mining Company as well as cash advances made to that concern.

Bonsall

Reports that shares in the Bonsall property in Gowganda were being quietly acquired last week, are out of date, according to authentic information to the Journal correspondent. The O'Brien has not only held control, but has held practically all of the shares of this company for some time. Any work done will consist of extensions underground of the Miller Lake-O'Brien Mine itself.

Coniagas

Official confirmation has been received in regard to last week's report that the Coniagas has dropped its options on Lande Lake properties and is taking out its exploration equipment.

THE SILVER MINES

Nipissing

According to the regular monthly report by Hugh Park, manager, to the president and directors of the Nipissing Mining Company, the result of work continues to be extremely favorable. Mr. Park says:—

"During the month of March the company mined ore of an estimated net value of $172,747 and shipped bullion of an estimated net value of $362,441. The value of the month's silver production was estimated at 65 cents per ounce. The amount of cobalt produced was 24,936 pounds.

"Most of the month's underground development continued to be favorable. No new veins were found, but development work on several small veins was encouraging.

"The low grade mill treated 7,369 tons. The high grade plant treated 152 tons. The refinery shipped 554,715 fine ounces of bullion."

Consolidated Mining and Smelting Demonstration

By ALEXANDER GRAY

The annual financial report of the Canadian Consolidated Mining and Smelting Company is a refutation of what "can't be-did" contented, as it is the only "can be-did" organization of its kind on this or any other continent during 1921, it follows that the demonstration in force accomplished the purposes of the administration and management, even though the profit was paltry. On a turnover of 110,000,000 lbs. of zinc and lead, 1,173,890 ozs. of silver, and 51,037 ozs. of gold, the net profit was $338,447, or 3.21 per cent. on the outstanding stock, after charging off $232,693 for development and allowing the usual amount for depreciation, this being the status of the profit and loss account:

	1921.	1920.
Sales	$ 7,516,865	$ 7,227,611
On hand, etc.	2,779,131	3,336,163
Other rev.	8,575	31,287
Pow. Co. div.	256,960	241,844
Total income	$10,561,834	$10,837,205
Ore prev. year	3,336,163	2,987,297
Custom ore	385,998	1,717,102
Freight	634,873	517,029
Gen. exp.	5,270,372	1,971,003
Development	232,693	203,278
Depreciation	105,357	105,116
Directors' fees	3,300	8,800
Write-off	22,736	10,928
Net profit	$ 570,043	$ 291,319
Bond int.	321,596	251,023
Net earnings	$ 338,117	$ 10,326
Dividends		790,020
Balance	$ 338,117	$ 719,701
Taxes		99,618
Prev. bal.	$ 338,117	
	809,011	1,068,333
P. & L. B.	$ 1,147,461	$ 809,011

Temerity of Directors and Management.

To do that involved more than oriental philosophy. The item credited to custom ore when compared with that for 1920, clearly establishes the fact that the Consolidated company almost monopolized the field, other producers being negligible. Universal metal market conditions excluded the generality of properties from extensive operations. Not until the latter half of the year, too, did it look as if the Consolidated would win a profit. That makes the results the more exceptional. It could not be expected, under the circumstances, to materially alter this banking position.

Liabilities.

Bonds	$ 3,000,000	$ 3,000,000
Stock	10,533,700	10,533,700
Accrued int.	112,721	121,875
Spl. loan	1,992,000	1,750,000
Other loans, etc.	3,171,957	3,601,201
Accounts pay.	1,121,356	1,777,163
Tax reserve	67,725	87,865
Surplus	1,147,161	809,011
Total	$21,317,171	$21,681,122

Ordinarily, and were the potentialities of this enterprise in all of its ramifications open to debate, those loans and accounts payable would warrant elevation of banking eyebrows. But the company has a profit and loss surplus of $1,147,161,161 and this away

Assets.

	1921	1920
Properties	$10,381,620	$10,400,166
Plants, net	6,173,873	6,241,480
Ores, metals, etc.	2,779,131	3,336,163
Stores, etc.	1,312,350	1,486,920
Accounts pay.	1,121,356	1,777,163
Prepaid chgs.	27,277	29,345
Cash	101,131	69,750
Total asset	$21,317,171	$21,681,122

Advances in Metallurgy

When it is understood that operations at the December 31st last have been cleared up to date as to metals on hand or in process the compliments be-

showed upon the staff by President Warren express the sentiments of those who hold that Canada is capable of securing a larger participation in metal markets. By perfecting metallurgy and obtaining greater efficiency throughout, General Manager Blaylock is enabled to put it on record that the company succeeded in smelting a mixture higher in zinc than any other plant in existence is treating. New standards in recoveries and costs, the grade and quantities of the ores accessible (the Sullivan Mine alone is a guaranteed bond) permit Mr. Blaylock to go further and to represent that the year in review was in many ways the most successful in the history of the company; adversity in the earlier months in contrast with what was accomplish in the last half convinced him that operations can be conducted at a profit under the most trying conditions. Mr. Blaylock pays tribute to the "spectacular" work accomplished at Trail, by selective flotation in separating the finely disseminated sulphides of iron, zinc and lead in the Sullivan ores, (something that Can't-be-dids" claimed was impossible), so, having seconded the General Manager, who courteously awards credit where credit is due, the President, Mr. Warren, subscribes to this peroration:

"There has been such an improvement in the extraction of lead and siver from the Sullivan Mine ore that the capacity of your lead and silver refineries is no longer sufficient to treat the lead bullion produced by the blast furnaces. Your directors have therefore authorized extensions to enable 150 tons of lead bullion to be treated daily.

"Metallurgical processes in the zinc plant having reached the point where it is safe to undertake the treatment of customs zinc concentrates in addition to the zinc concentrates from your own mines, your directors have authorized the installation of the plant necessary for this purpose. It is hoped that shipments from independent producers can be accepted about June 1 next.

"A very effective selling organization has been built up. It covers Asia and Europe as well as the domestic market. Its operations are being extended so that ultimately the "Tadanac" brand of lead, zinc and copper will be purchasable in all quarters of the globe.

"Generally speaking, you may look forward with confidence that your products, with the possible exception of copper, will be marketed with a fair margin of profit."

Future Development

Commanding the situation by right of enterprise and the investment of capital, the Consolidated Company have earned a goodwill that will be highly remunerative in the long run. The prices obtained for their metals were abnormally low. But the policy is one of production and more production. Besides, relief is to be given to smaller producers by the treatment of custom ores, the idea being to afford an outlet for zinc-lead-gold-siver ores. Extensions to the smelting plant are being constructed. It is the announced intention to pay from 60 to 85 per cent. of the zinc for 80 per cent. of the gold and silver in the zinc ore, and for 80 per cent. of the lead, less five units. The gold, silver and lead recoveries will be in the smelting of the residues after the leaching out of the zinc and the smelting charge will be less as the zinc ore increases.

Possibly, for the time being, the customs department will not be fruitful as to profits. The company wish to promote general mining in a Province that possesses mineral wealth comparable with the most productive sections elsewhere. Sooner or later a saving in freight bills will be effected by the erection of a concentrator at the Sullivan Mine. When the copper market improves and export business can be settled, plants for the treatment of Consolidated ores wil be forthcoming. In reality, the 1921 operations are to be regarded as preliminary, and when the money market relaxes it is not unlikely those who have doubted the ability of Trail to sustain the optimism of the administration, will regret their rash judgment.

Sullivan Mine Increasing in Magnitude.

However the Trail Metallurgical Works may have met company requirements, it is the Sullivan Mine that supplied almost 300,000 of the 400,000 tons treated. The Sullivan grade averages so high in zinc and lead contents, it was imperative that an end should come to the low recoveries of previous years. So great a mine with a tonnage and gross value worth very much more than the company's capital commitments, made it incumbent upon the administration and management to better the extraction. Having accomplished this, abandoned selective mining, and solved ore-handing problems in stopes of low dip, only the laity need to have been informed in the annual report that working costs were materially reduced. Already THE CANADIAN MINING JOURNAL readers have been told of the progress made by development and by diamond drilling, indicating further extensions of the ore zones. At the upper and lower tunnel levels, not only have lateral continuity, widths and grade been maintained beyond points intersected by drills, but an agreeable surprise was furnished. In reference to this the report says:

"An interesting, and what may prove to be an important development in the Sulivan ore bodies, was the discovery by diamond drilling of apparently a parallel ore body in the footwall of the main vein, at the north end of the South ore zone.

"The work to date is insufficient to determine the relationship or to prove that it is not a faulted portion of the original vein. Assays of drill cores, however, which showed a width of vein of approximately 20 feet, gave better silver values than the average in the main vein, being about one-half ounce to the unit of lead. Zinc values, on the other hand, were rather lower than the run of mine ore."

When power and concentrating facilities are provided, and are "more in line with the capabilities" of the property, as the report naively puts it, the millions of tons in the known ore reserves and "prospects of continued satisfactory development" will sustain every claim put forward by the Board, and leave no alternative other than to keep on equipping such a mine with whatever it requires. In a year of stressful markets, the Sulivan maintained two thriving communities, contributed remunerative freight to the Canadian Pacific Railway, established markets in two hemispheres and probably convinced "doubting Thomases" that the few bright spots should not be overlooked.

WHITE ROCK

Mr. Wm. McVittie of Sudbury, Ontario, president of the White Rock Mining Co., whose property is at Shiningtree reports that high grade ore has been encountered in the drift at the second level. The vein is much wider at this level than at surface.

Notes From Nova Scotia

Production at Wabana

Wabana Iron Ore Mines, Newfoundland, have been giving a daily output of from 28,000 to 30,000 tons during the winter months. This represents half the capacity of the four mines, which are equipped for an output of 60,000 tons. Less than half the working force of 2,200 men are employed, but when the shipping season opens this number will be increased.

Most of the ore output is being delivered by the Empire Steel Company vessels at European ports. The quality of the ore has been found excellent for steel-making in Germany, and 800,000 tons were contracted for this year with the option of taking 200,000 tons additional if needed. In normal times the Empire Steel Company's plants use 750,000 tons.

The supply of ore, so far as known, is unlimited and cannot be determined because most of it lies under the sea, but it is far beyond the amount of fifty million tons, which was the calculation of the New Glasgow men who first owned it. To say that there are billions of tons might not be incorrect; but it must not be forgotten that the mining of all under-sea minerals, whatever their quantity, has limitations set either by the cost of haulage or by the pressure on the seams. Thus coal lying at great depths sometimes cannot be won. In this case, with no change in the dip, haulage would be the limiting factor.

Wabana measures have three iron-ore seams. The general impression is that Wabana mines are simply of mountainous bulk lying underground. This is far from the truth, for Wabana ore is laid down in well-defined seams, just as we find coal. Britain has stratified iron-ore seams, but they are usually thin and are designated according to color, being known as black and clay bands.

Mining Methods at Wabana

The ore seams of Wabana have a dip of 9½ degrees, and except where faults are met with, the grade is fairly uniform. Faults are occasionally met, the majority of the heaviest being down throws, the up throws being light. In approaching these, great care has to be taken, for the fault planes are sometimes filled with a soft clay substance, which, under pressure, would, if permitted to run, quickly fill up a large section of the mine. In all development work, diamond drills are used and boreholes are kept well ahead to locate water pockets and faults or any other unknown condition. Owing to the many faults such mine plans must be carefully kept.

In all ground that is known to be faulty, a grouting machine, capable of working against a pressure of 1000 tons, is kept ready for use, and when fault planes are reached the sides are quickly and carefully concreted. The slopes are driven of sufficient width to permit of double tracks, with plenty of space between passing trips. Levels are driven at distances of 500 feet and rooms driven with 50 foot centres, with crosscuts 22 feet wide at a distance of 40 feet. To protect the slope, pillars 50 feet square are left, but from this on the pillars left for support are small and fully 85 per cent of ore is mined from the rooms.

All blasting is done by night after the men have left the mine. No mine gas has ever been met with in these mines.

In No. 2 mine considerable ore is loaded by hand, but in No. 3 there is nothing but mechanical loaders. These shovels handle 250 tons of ore per day, and in thick seams one room will keep a loader busy all day. To see this machine at work down in a mine reminds one of a steam shovel on the surface. In thin seams the Myers-Whaley loading machines are used.

The single trip system of haulage is used on the slopes, while on all levels the tail rope system is in use. Mine cars are transported from the rooms to the levels by means of electric hoist of 30 h.p.

Crushing, Cleaning and Storing the Ore

The bankheads are very simple in design. The full boxes after reaching the run in on the bankhead, pass by gravity through single tipples, and continue to the back switch and then to the empty track.

From the tipple the ore is passed on to a steel picking belt where rock partings are picked out. After going through No. 8 Gates breakers set to 3 inches, the ore is passed to a second picking belt where it is again cleaned and delivered into a bin from which it is either loaded into tram cars for shipping to the piers in the open season of navigation, or loaded into stock pile cars to be stocked.

A unique system of stocking ore without any trestle is used. Beginning from the ground and gradually increasing from an angle of 15 degrees to 45 degrees by the use of an outrigger the ore pile is built up to the desired height. An outrigger is a simple device made of two pieces of hard pine 2 ft by 30 ft, on which rails set to gauge are placed, the ends being turned up to prevent an overrun. One half the outrigger projects over the apex of the pile. As the ore piles is built up the outrigger is moved forward until the [illegible]

Ore Pockets and Loading Piers

The ore is carried from the [illegible] in cars by an endless haulage system, consisting of a speed of five or six miles per hour. The ore [illegible] steel with a capacity of [illegible] tons. The [illegible] interchangeable and can be used on the [illegible] moving the rope grips with which all [illegible] equipped. At the pier terminals the cars pass [illegible] cable trestles, where the ore drops from [illegible] the ore pockets. These pockets hold [illegible] tons each, and were excavated [illegible] elevation of trestle at discharge above [illegible]

feet. Under the pocket at an elevation of 87 feet, a conveyor tunnel was driven from which raises (or chutes) were driven to tap the ore in the pockets. These raises are steel-lined and equipped with doors to control the flow of ore as it passes to a conveyor operating on a steel trestle pier. The drop from the conveyor to the vessel is 82 feet. This gives sufficient velocity when deflecting hoods are used to send the ore to any part of the vessel.

When ore is loaded from the stock piles, steam shovels are used. These load into portable hoppers, which in turn fill the cars, the shovel being too large for this work. The distance by tram line to the pier pockets is 11,000 feet. Six thousand tons of ore have passed over this line in one day. This means 400 cars per hr. or more than one car per second. The leading conveyor has a capacity of 2,500 tons per hr., when loading ore into vessels.

A humorous story is told in this connection of a Norwegian sea captain, who was in the ore trade from Narvik to Emden in the year 1913. Having had a tempestuous voyage of twelve days, he felt like taking in the sights when he reached Wabana. As soon as he docked he went to his cabin, shaved, bathed, dressed up and went on deck, only to be handed his clearance from the pier Superintendent. This surprise was too much for the Captain who was in a holiday mood, and immediately the atmosphere became charged with something very much akin to burning sulphur. The vessel had actually been loaded within three hours from the time that it was docked.

Prospecting the Seams

No. 3 mine is prospecting the outer under-sea areas and is kept well ahead of all the others. The vertical depth at the mine faces is 1600 feet. The workings are reached through a slope driven in the strata under what is known as the Dominion bed for a distance of 12,000 ft. This seam is 26 ft. high, and large electric loaders with arms of ten foot spread are used. The ore is loaded into specially designed drop-bottom steel hopper cars, drawn by electric locomotives and emptied into a pocket directly over the main slope, from which it passes into a 20-ton steel hopper car or skip in which it is drawn to the surface. Here the assorting and cleaning of the ore as already described takes place.

Up-to-date wash houses with shower baths and lockers for clothes are built at all mines. The motive power of the plant is electricity, generated from coal.

The amalgamation of the Dominion and Scotia companies reduced the over-head charges by more than 30 per cent. The power plant of the Dominion Steel Company was found sufficient to do the work of both companies, the Scotia power plant acting as an auxillary in case of a break-down. Officers in charge in Wabana are C. B. Archibald, superintendent of operation; Angus MacDonald, mining superintendent; J.B. Petrie, mechanical and electrical engineer; A. R. Chambers, consulting engineer. H. B. Gillis is general superintendent over all mines, quarries, piers etc. in connection with the iron-ore department.

Advertisements other than "Employment Wanted" or "Employees Wanted" will be inserted in this department at the rate of 20 cents per agate line (14 agate lines make one inch). $2.80 per inch, each insertion, payable in advance. Space measured from rule to rule. When four or more consecutive insertions of the same advertisement are ordered a discount of 25 per cent. will be allowed.

Advertisements of "Wanted Employment" or "Wanted Employees" will be inserted at the rate of two cents a word, net. Cash must accompany order. If box number is used, enclose ten cents extra for postage in forwarding replies. Minimum charge 50 cents.

FOR SALE.

Complete Mine equipment consisting of:—
2—60 H.P. Portable Boilers Complete,
1—Donkey Boiler with Hoist,
1—Hoist.
1—3 Drill Steam Compressor.
1—8 x 8 Belt Driven Compressor.
1—Electric Lighting Outfit complete.
1—10 Ton Capacity Holt Tractor.
1—Leyner Drill Sharpener.
1—10 x 16 Farrell Crusher with Screens.
Pumps, Drills, Stopers, Milling Equipment Etc.
Laboratory outfit with small crusher, glass ware, balances, etc
Above installed only short time and in good condition.

J. G. SIPPRELL, B.Sc., Engineering Equipment, Bedford Chambers, Halifax, N. S.

ENGINEERING EQUIPMENT CO. SALES ENGINEERS MONTREAL LIMITED

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EDITORIAL

The very first step of all in any well-founded scheme of conservation is to know what we have, not only in those portions of our Dominion that are settled and partially developed, but also in that vast northern land, of which too little is known at the present time.--R.L.Borden--1913.

PROSPECTORS TO THE RESCUE

On both sides of the Atlantic the migration (as it is now properly called) of British people is engaging serious attention. In Canada, those responsible for immigration policies have decided that what our country needs most is settlers on the land. This is undoubtedly true. The natural drift from country to city will always provide sufficient industrial workers, and to add to their numbers by immigration is merely to reduce the opportunities of all for earning a competency.

There is one feature connected indirectly with immigration policies that is seldom given due weight, and indeed is often disregarded entirely by authorities that should know better. The importance of mining in our national economy is habitually underrated, and is often ignored. The Canadian Mining Journal has often drawn attention to this fact, and will now approach the question once more, from a different angle.

Our farmers must have markets for their produce. At present a considerable fraction of the total agricultural production is exported, and so helps to pay our international debt and to reduce our national debt. To stand best the cost of shipment to far-distant markets, agricultural products must have the greatest possible value per unit of weight, hence the tendency to ship beef and pork, instead of the grain and fodder that are used to feed the animals. This suggests two points of interest to the miner and to the country at large.

If markets can be found close at hand for agricultural products, the farmer will of course get better prices. If the home market can be expanded, settlement on the land will be given an impetus that the opportunity for export trade cannot equally provide. The home market can be expanded only through the growth of the other basic industries or of the industrial population. Ruling out the latter as essentially dependent upon an increase in the basic industries, we can safely conclude that the development of the home market rests principally upon the development of the mining industry.

Not only do mining communities provide profitable markets for farmers, but the roads and railways built to serve the mines open up agricultural land that would otherwise be inaccessible. Thus the development of mineral deposits proves a double boon to the settler; it gives him access to his homestead and it provides him with the best of markets.

It may be argued that we must build up an export trade if we are to meet our external obligations and leave sufficient balance to make the country prosperous. Quite so. But why not export what will bring the maximum of profit? If it pays better to export bacon than to export corn and shorts, why not sell gold, silver, copper and lead instead of either?

All this presupposes the possibility of finding and developing more mineral deposits within our borders. There is plenty of evidence that potential mines are to be had for the searching; our problem is to find persons competent and willing to conduct the search.

Thus, once again, we come to the prospector. Upon him rests in large degree responsibility for the prosperity of our agricultural population. Without him, the mineral industry would decline and die. With increasing mineral production come increased industrial activity, better home markets for farmer and manufacturer alike, and an export trade of the most lucrative kind.

The prospector deserves, from all and sundry, more serious attention than has ever yet been accorded him. One successful prospector can provide employment for a thousand miners, scores of farmers, and dozens of industrial workers.

"MODERATES" IN CONTROL

In these dark days of industrial depression and labour disputes, it is encouraging to find that throughout the British Empire leaders of "moderate" tendency have regained control. This augurs well, not only for the solidarity of the Empire, but for the prosperity and industrial well being of its component parts.

The [illegible] of the series of struggles [illegible] Mother-land. The [illegible] concessions wrung by [illegible] from the mine owners and from the public during the critical war years culminated in the demand for the nationalization of the mines. The public judged the [illegible] rejected the labour leaders, their [illegible] and re-

dical demands, and secured to the miners a high rate of pay in return for a good day's work.

In South Africa, where the strikers on the Rand resorted to force, the conclusion has been summary and decided, as befits military action. That a revolution, brought about by armed force, was intended by the agitators that precipitated the trouble, is attested by the official statement issued after the rebels had been dispersed. "People of all political convictions came forward to help the Government to put down what there is no doubt to have been a social revolution by Bolshevists, International Socialists and Communists." That the miners have returned to work pending an investigation of their grievances, speaks well for moderation of a large majority amongst them. That the burghers turned out almost "en masse" in support of their Government, demonstrates their appreciation of settled rule and the ideals of British justice. Premier Smuts has promised the miners that in spite of the revolution engineered in their name, their complaints will be considered impartially by the commission of enquiry now to be instituted. His word is his bond.

For years the political struggle in Australian has been between labourites of moderate views and those with a radical tendency. In New South Wales the latter have until lately been in control. Some attribute to this the fact that the productiveness of labour in New South Wales has lately fallen to such a low mark that industry there is now virtually paralyzed. New South Wales is blessed with many natural advantages; but these will be useless until the unnatural disadvantage due to the artificial restriction of output is removed. That the late Government under Premier Dooley is partly responsible for this state of affairs is demonstrated by the fact that he offered what was virtually a wholesale bribe to railway employees in his pre-election promises regarding wages and hours of labour. Happily, his regime is ended, and New South Wales may look for a return to prosperity under a leader whose principles are more in accord with true British tradition.

The recent attempt to traduce the morality of Nova Scotian miners has been an utter failure. That the living conditions in the colliery villages are far from ideal, is an undoubted fact, and the public should know more about these conditions, in order that they may judge fairly the miners' demands. That the miners have now unequivocally refused to accede to Organizer MacLachlan's "sabotage" advice, should give them a place in the regard of the public that will ensure fair treatment at the hands of their employers.

We print today a letter from Mr. Robert Baxter, once again the recognized leader of all the Nova Scotian mine workers. The moderation expressed in this letter, and the justice and frankness of the views he states, command the respect of the public. We wish that more of our labour leaders were like Mr. Baxter.

GLACIATION OF MINERAL AREAS

The fact that most of Central Canada was at one time subjected to erosion by a moving blanket of ice, and that now the rock surface shows no noteworthy amount of weathering, is of prime importance to our mineral industry. To the glaciers may properly be attributed the removal of the products of ages of weathering. It is remarkable how little the rocks have been distintegrated since the glaciers retreated. Here and there is found some weathered material at surface, and occasionally oxidized material is found underground; but the really amazing fact is that minerals so easily oxidized have been altered so little. At Cobalt the trenching often disclosed smaltite that had been protected from weathering since glacial times by a thin covering of clay. After exposure the smaltite would rapidly be oxidized to "bloom"; yet the blanket of soil had protected it for ages. Similar indications of the inconsequential dimensions of weathering since glacial times are everywhere evident in the mineral areas. Under the circumstances it may be accepted as a general rule that weathering since glacial times has had little effect on most minerals deposits in the mining areas of the pre-Cambrian shield.

But in the ages before the glaciers crept Southward there was a tremendous amount of weathering and erosion. The pre-Cambrian mountains had been worn down almost to the level of the plains. Over all, or nearly all, was a layer of decomposed rock, including the weathered upper portions of ore-deposits. Then came the ice age, and advancing masses of ice scraped this loose material from off the solid rocks, and in places doubtless wore down the bed rock to some extent. It is improbable, however, that the glaciers wore down solid rock very much; and the constantly recurring statement that it was by glaciers that the rock hills were reduced is now archaic. Glaciers are powerful agents of erosion but they should not be credited with more than their due. They were more efficient than steam shovels in cleaning away loose or soft materials, but like the best of shovels they have their limitations. The mountains were not planed down by the ice-sheet, as was formerly claimed, but the surface was cleaned and polished by glaciation after long ages of weathering.

The important fact to the miner is that the weathered products have been removed and that the mineral deposits exposed at surface have characteristics not dependent on weathering since glacial times. The chance section exposed at the present surface is more likely than not to be an average section.

THE SALE OF SECURITIES IN ONTARIO

The Ontario Government is evidently satisfied that Blue-Sky legislation is not wanted in Ontario. The bill concerning the sale of securities, now before the Ontario Legislature, will not prevent men venturing if they want to. The purchaser himself will have to decide whether or not the chances of success warrant in-

vestment on the terms offered. No attempt will be made by the Government to determine what the chances of success are. There will be no governmental examination of properties for the purpose of determining their merits. Some of the most objectionable features of Blue-sky legislation are therefore being avoided.

There has been a strong feeling in Ontario against proposed protective legislation, because of fear that an ill-considered measure would create new difficulties for those that endeavour to make mines out of prospects. Apparently it has been recognized that no one person or group of persons is competent to judge the merits of all mining ventures. So long as this is realized, the efforts to protect investors are more likely to meet with some success without impeding the progress of the industry. The provisions of the proposed bill indicate that the Government is avoiding responsibility of determining the merits of enterprises, and consequently a good deal of the opposition to the bill will disappear. It was feared that governmental supervision of mining ventures would be interfering and harmful, and it is a relief to see that it is not to be attempted.

The provisions of the proposed bill call for the filing of full information with a Commissioner of Securities. No adequate prospectus must be given to the investor to make the transaction binding. The aim is to provide the investor with information; after that it is up to him to use his own judgment. These seem reasonable provisions; in fact they are the recognized methods now governing the sale of shares. The new feature is the Commissioner of Securities, who will have authority to see that promoters comply with the law.

As the proposed bill does not forecast objectionable governmental supervision of business ventures, the men who endeavor to make mines can continue to use their own judgment, instead of waiting for some public official to tell them whether they may do so or not. The fear of impending experimental legislation has now been removed. Well-tried British measures have been adopted, to the exclusion of measures such as have lately hampered mining development in some other countries.

EDITORIAL NOTES

A press despatch announces "miners doing housework – spring cleaning this year has no horrors for the housewife in the anthracite coal fields." Presumably the strike is a blessing in disguise.

Birds are singing, buds are bursting. The lakes are free and the rivers are in flood. The prospector's season has begun. Reports from the winter rendez-vous of bush-whackers indicate that the old-timers are all ready for the jumping off, and that a host of novices will join them. We wish them good luck, and a quick return on their investment of honest toil.

The Lord helps them that help themselves. This being so, all three nickel companies are qualifying for divine aid. Staffs no longer hard-pressed by the duties of operation have turned to research, and now new ventures, involving new processes, new plants and further investment, are to recoup the failing fortunes of Nickeldom. Such initiative brings its own reward, though it is seldom understood or appreciated by outsiders.

The reports of the commercial use of lignite and peat in numerous countries where cheap coal is not available lend interest to the attempts in Canada to use these low-grade fuels. The researches at Alfred, Ontario, and near Estevan, Saskatchewan, are being carefully and logically conducted, and merit close attention.

TO THE RECENT GRADUATE

Acumen, vigour, both combined
With supermind omniscient,
Is what we're taught that we shall find
In graduates efficient.

I shall not say I've ever known
I do not speak unkindly
A graduate so god-like grown
That I'd admire him blindly

I've met a few in knocking round,
And I've been disappointed
They might be safe, they might be sound
They *weren't* the Lord's anointed.

No genius rare anointed them,
No spark divine inspired them
For if it had, alas, ahem,
Employers would have fired them.

They prospered only if they worked
And toiled *sans* intermission,
No graduate that ever shirked
Achieved a high position.

Envoy

This highly moral verse I think
Exactly what it *should* be,
I wrote it with a solemn wink
As wise a wink as *could* be.

In glancing over bank accounts
Of graduates I've *worked* with
I see some very fat amounts
Are owned by those I've *shirked* with.

XNOX

A Labour Leader's View

Glace Bay, Nova Scotia,
April 21, 1922.

Editor Canadian Mining Journal,
Sir:

You ask me to give you the men's side of the controversy between the British Empire Steel Corporation and the workmen. I suspect it would be superfluous to describe all the negotiations in detail, as most of that has been published over and over again in the press. You also state that I am considered a conservative leader, and people would appreciate an explanation of the situation from myself. I do not know what is meant by conservative; if it means that I would not ask or take so much as others, then I want to disabuse your mind on that, as I am like Oliver Twist in wanting more, or in other words I am out for all we can get. I look on this as the philosophy of both capital and labor that is the contentious part of our trouble. However, I take it that the public are more concerned as to the differences amongst ourselves.

When in Montreal from Feb. 27th to March 1st inclusive, we had an offer from the Company, of an additional 15c a day for day's wage men. The offer was made with the provision that we (the Executive Board) would make the recommendation to the men for acceptance. The Company had told us forcefully and solemnly that this was their final offer; consequently it appeared to us as a choice between two evils, strike, or acceptance. When all the complicated factors were considered, five of us decided to make the recommendation, the other three agreeing to remain neutral. But we had no sooner reached home than one of the five withdrew his support, and the others went out on the campaign against the offer. The result was a vote that gave a 7 to 1 majority against acceptance.

All dealings between company and men are conducted by a valuation of force. We make an analysis of the company's position, and no doubt the company does the same with ourselves. One of the executive officers found the men were much discouraged by the severity of the cut in wages, and were not doing so much work as usual; also the officials of the company were annoyed because of the increasing cost. This prompted the idea of pursuing a policy of irritation, namely "cutting down production", "strike on the job", "loafing on the job", "ca'-canny" or "sabotage". I could not agree with McLachlan on this policy, claiming that if we had not a chance by strike, then the Company would recognize our weakness and lock the men out, which would create circumstances equal to strike, and this would put us in a position recognized by all to be weak. This is only one of the many methods by which the policy could be attacked, and because of its many weaknesses I could not subscribe to it. On the whole it is a vicious policy; to quote Gladstone, "I don't want to use hard words, which are easily employed and as easily retorted, a game that two can play at". That quotation explains my position. If we play a vicious game what can we complain of if the company plays vicious too? We could have "crossed the Rubicon", the war would be on, there would be no retreat, it would be a matter of crush or be crushed. As we are situated, the Province of Nova Scotia cannot afford to have the company crushed; it is a source of livelihood to a large percentage of her people. We (the coal miners) will not be wise in our own interests, if we pursue a policy wherein a break is very probable. There is much good that can result from having an opportunity to meet the Company officials in negotiations for wages, working conditions, and a hundred and one small matters that are constantly cropping up amongst the 12,000 miners whom we represent.

The cut that was put into effect was very severe; some of our highly skilled contract miners would lose over $2.00 per day. I had secured a favor from the International officials excluding Nova Scotia from the strike of April 1st, because of our not being much of an economic factor amongst the rest of the coal miners of the continent, in the struggle now taking place, and also, that our negotiations were seemingly nearly complete. This arrangement was made months before the big strike took place, with such advantage for the company and ourselves that it should have been the care of the company not to have asked for such a sweeping reduction. A contract for ten months, as is proposed, would allow them, if it were found our wages were out of proportion after the final settlement is reached in the United States, to have further adjustments.

Our hopes are now centred on the Conciliation Board about to be established. The findings of the same will go a long way to bring about the desired peace, which is necessary if the best returns are to be achieved for all concerned,—public, workmen, and companies. My aim has always been efficiency; to get such in mining, the co-operation of the men is essential. What the men want is an open game, where all the cards are on the table, where there are prospects of returns, and the knowledge that others, such as the consumers, are not being made to pay more than a fair price for the commodity we produce. With open arrangements such as outlined, better results could be obtained. There is just another grievance. Mining villages are most often built cheaply, companies possibly fearing that the life of the mine would not be of sufficient duration to warrant putting up expensive buildings. This in my opinion is a great mistake. It most often happens that the mine outlasts the houses. In this advanced age there should be no communities of any size without modern conveniences. The coal miner (that is the contract worker) is highly skilled; he works at a high speed, especially when young and vigourous. His average earnings, when everything is favorable, are much better than many other workmen, and the result is, that he is ashamed of the ancient methods of sanitary accomodation, and degenerate-looking buildings. Much could be done in this direction to give peace and comfort to those who produce that valuable material, coal which is of such great service to our present industrial system.

Yours, etc.

Robert Baxter.

Lammers and Maase, Ltd., of Montreal, have issued Brochure Te 4, describing the "Polar" Diesel engine. These are made in sizes ranging from 100 to 3000 B. H. P. Smaller units, from 12½ to 75 horsepower are also made. Special features claimed for the "Polar" engine are high speed, strength of design and simplicity of construction, and low fuel consumption is guaranteed.

Though most of our mines and mills are normally operated by hydro-electric power, it is often necessary to have additional power either as an auxiliary or as a stand-by. A crude oil engine should serve this purpose excellently well.

Holding The Sapphire Diggings

By DONALD C. SIMPSON.

THE following narrative is a true account of an experience I had over thirty years ago on the banks of the Missouri River at a place called El Dorado Bar. Here, after a summer's prospecting, I had secured a job under a big strapping Scotchman who was in charge of operations for a mining Company engaged in mining for sapphires.

El Dorado Bar had been worked for gold in 1860 and for several years after that by the overflow of the Argonauts of '49 who had spread north, through Oregon, Washington, Idaho, and Montana, and up through British Columbia and Alaska as well. The Bar itself was a huge bench of gravel, perhaps half a mile wide by two miles long, and of varying depths. The gravel lay on a slate bed-rock, and at the joint where operations were preceding when I worked there, the gravel and surface soil were only about six feet deep. It seems that the attention of the Company had been drawn to the ground, from legendary reports of certain glassy looking pebbles that had been observed by the early miners when cleaning up their sluice boxes to recover the gold accumulated between the riffles. The early placer miners had no idea of the possible value of the bluish pebbles that they had thrown away so freely with the rest of the gravel on their dumps. Years afterwards, Macaulay, the Scotchman already referred to, had some of them examined by a competent authority, who pronounced them sapphires of very good grade, so the excitement was on. Macaulay kept his information to himself until he had organized a company and had secured in some way or other all the ground comprising El Dorado Bar. His next step was to mine some of the stones and find a market for them. That market appeared to be in England and Scotland, and it was reported that the Baroness Burdett-Coutts had bought some of them, besides other members of the aristocracy; also that the then Prince Of Wales, (afterwards King Edward), the Duke of Fife, and other notables had formed themselves into a company to purchase the sapphire mines of El Dorado Bar, and work them on a big scale, à la Kimberley.

In the meantime, we miners were kept on digging away, prospecting virgin ground, and producing sapphires. The "modus operandi" was very simple, and consisted in stripping off the surface soil and the first three or four feet of gravel with picks and shovels, leaving the lower eighteen inches or two feet of gravel on bed rock as it always contained the bulk of, as well as the best of the gems. Of course the gravel, clear from the surface, carried more or less gold, but that was only a secondary consideration with the company. After stripping a small area, the next move was to clean up the eighteen inches to two feet of gravel left on bed rock, shovel it into sacks, and haul it with a horse and cart down to the river, less than half a mile away. Here it was put through a crude apparatus called a "Jigger," which was simply a wooden box with small holes bored through its sides, and suspended from the small end of a pole. The "Jigger," filled with gravel, was worked up and down in the water, thus washing away the fine sand and gravel. It was kept going until there was nothing left in the hopper but fairly coarse gravel, which was spread out on a long table, and the sapphires, with occasional red stones said to be rubies, picked out by hand and preserved.

We were working away peacefully and enjoyably in this way, for the weather was fine, and the air sweet and bracing during the day, after the sharp frosts prevailing at nights, when trouble broke over the camp.

It appears that the report already in circulation, that the sapphire fields had attracted the attention of British capital, was well founded, for it now transpired that a British company had not only become interested, but had actually signed an agreement to purchase the El Dorado sapphire mines for several millions of dollars, provided the property was reported on favorably by an expert already on his way from England with power to definitely close the deal. Of course here was a fine opportunity for members of the "easy-money" fraternity, then and now quite numerous in the West, always ready to "butt in", to make as many dollars as possible without exchanging anything in the shape of vulgar sweat therefor, either mental or physical, and not at all particular as to the methods adopted.

One day, just after our mid-day meal, Macaulay arrived at the camp from Helena full of excitement and imparted to us the astonishing news that General W—, a speculator from Butte, had been in Helena the day before, making the rounds of all the popular places of resort and boasting that he and a crowd of his friends, all handy gun-men, were going out to El Dorado Bar to "jump" the sapphire ground. It had come to their knowledge, he claimed, that most, or all the titles of Macaulay's company to the ground were defective. Macaulay assured us that the titles of his company were perfect, and that this threatened claim-jumping on the part of General W— and his associates was only a blackmailing scheme, got up to extort some money from the company on the eve of closing a deal involving millions of dollars. The British company of course would be shy about investing their money in a property, the ownership of which was in question, either rightly or wrongly. Macaulay said he had taken the best legal counsel in Helena, and had been informed that in the case of unpatented mining claims, the easiest way to avoid lengthy and tedious litigation was for the owners of the claims to retain possession, and prevent trespassers from stepping on the ground, and if they did get on the ground to eject them, by force, if necessary.

This certainly seemed a pretty kettle of fish, so Macaulay interviewed the peace officers of the county in order to find out what action they would take towards protecting his property from trespassers, and was blandly informed that they could take no action until hostilities had actually begun, when they would have to intervene in order to preserve the peace. This was still more interesting, and it began to dawn on us that the law was truly a fearful and wonderful thing, and as somebody has said considerable of a "hass". As no mention was made of the *exact time* of intervention by the peace officers whether they should undertake to "preserve" the peace *after* it had been smashed to smithereens, and everybody more or less shot up, or step in at the psychological moment to *prevent* a breach of the peace was an open question. In any case, as they were at least seventeen miles from the scene of expected hostilities and refused to take cognizance of trouble until trouble actually happened, it is difficult to see how they could possibly "preserve" the peace, although they might act as gatherers-up of the peace among the survivors, if any, afterwards.

At any rate Macaulay stated that his company had decided to defend the ground at all costs, and that Detective Y— with about a dozen other good men, well

arrest, had been employed to assist in patrolling the ground, and might be expected to arrive at the camp that night. As we had a short cut to Helena from the mine by crossing the Missouri river in our boat and then climbing a fairly steep trail to the top of the bench, where the stage road which went round by Canyon Ferry was met, our re-enforcements had a considerable advantage over General W—, and his gang. These would be obliged to follow the road to Canyon Ferry, cross the river there, and then proceed down the north bank for a distance of fifteen miles. There the road entered a very deep, narrow canyon, which it traversed for half a mile before debouching on the gravel bench of El Dorado Bar. It was therefore certain that the claim-jumpers could not arrive on the ground until the following day at the earliest, which gave us an opportunity to prepare for them, and if possible stop their progress at the strategic point, in the canyon, where a bridge carried the road across a small stream. We laid our plans accordingly.

It was compulsory for General W— and his reported cohorts of "bad" men to traverse the road through the canyon, as it was impossible to get to the sapphire grounds of El Dorado Bar with any appreciable quantity of supplies in any other way. An abundance of supplies was necessary so that if they did succeed in establishing themselves on the coveted ground, they would be able to camp there, either until the Macaulay Company paid them what they wanted, or until they had had time to put up monuments, and do the required loyal amount of development.

Macaulay found that most of his gang of miners, who were all Swedes, with the exception of myself and a middle-aged Welshman, had no fancy for "military" adventure, probably having had more than enough military service in their own country before they left. They preferred to go on peacefully manipulating a muck-stick rather than to strut round with their chests stuck out, with rifles on their shoulders, doing "sentry go," or any other military manoeuvre. Therefore, as I had expressed willingness to assist in defending the claims, being at just the right age to relish such goings on, Macaulay gave me a heavy revolver, with holster and belt well filled with cartridges, and ordered me to take the Welshman along, and to go into the canyon and tear down the bridge across the creek, and to use the timbers taken from the bridge in building a barricade or breastwork across the road. This we proceeded to do that afternoon, and I must say that the job suited me fine, much better than shoeing gravel, even if said gravel did contain gold, quite a few sapphires, and an odd ruby. Of course I was only twenty, and the glamour of romance was over everything. I felt that I was a "military" man, and embarked on a real honest-to-goodness adventure at last, whether it wound up in bloodshed or not, and it certainly looked serious enough then.

After tearing out the bridge and building a breastwork across the road to the best of our ability, we went home to supper and found the camp simmering with excitement, some men being busy cleaning out, and fixing up a spare building, long out of use, as sleeping quarters for our re-enforcements. Others helped the cook prepare vast quantities of "grub," for the amount of provender that twenty-five or thirty husky men, leading an active, out-of-doors life, and breathing the keen dry air of Montana in December, can consume, would certainly surprise, if it would not break the heart of the average city boarding house keeper.

After supper the camp settled down to await the arrival of Detective Y— and his men, but it was not until nearly ten o'clock that the night was made hideous by wild hallooing across the river, and we knew they had at last arrived. Two men were despatched across the broad Missouri with the boat and soon brought back a load of men and rifles, and whiskey too, I am compelled to say for everybody appeared to have a pocket flask, and seemed jolly, thought not in the slightest degree intoxicated. As the boat could only carry four men at a time besides the crew, it had to make four trips before all hands were safely across, when a lunch, with hot coffee was served to the new arrivals by the cook and his assistant, and after a smoke they were escorted to their sleeping quarters, where they bedded down in their blankets on the floor almost as tightly as sardines in a box. They certainly were a jovial good-natured crowd and all of them had "roughed it", while some of them had campaigned before, there being one or two ex-members of the Northwest Mounted Police, as well as several ex-soldiers from the British and U. S. armies, in the bunch. Of course, as always in a body of men, there were one or two humorists present. One of these assured some grumblers that "there was no occasion for grumbling about lack of room, for there would be lots of room by that time to-morrow-night."

After breakfast next morning and just as daylight was beginning to appear Detective Y—'s "army" with Macaulay and myself fell in, and marched up the road for about a mile to the canyon turn to await the approach of the "enemy". A scout on horseback had been dispatched some time before daylight, with orders to ride along the road for a couple of miles beyond the canyon, and to keep his eyes open for the appearance of General W—, and his force (which had been reported large), and to immediately gallop in, and warn us, if he saw them. So, we at the barricade had nothing to do but wait, and amuse ourselves, which we did by collecting a lot of firewood and building a huge bon-fire. Around this we sat and smoked and talked, each man holding on to his rifle with the exception of our commander Detective Y—, who had no rifle, only a revolver, and a five-gallon demi-john of whisky, which I observed he held pretty closely.

Along about noon, when we were all getting tired and beginning to think about lunch, we heard the drumming of galloping hoofs coming down the road, and our scout, a young Swede, soon appeared with a pale face and shouted to Macaulay, "they are coming" and rode round the end of the barricade and kept on his way to camp, without stopping, I presume in order to put the horse away safely.

"Come on boys, grab your guns and line up across the road behind the breast work", shouted Detective Y—, and as soon as the manoeuvre was executed and we were all set, I found out what the demi-john of whisky that our leader had cuddled so tenderly under his arm all day was for. He pulled a tin cup out of his coat pocket, and starting at one end of the line, he poured a brimming cupful of that "forty-rod" whisky, which he gave to every man with a curt invitation to "down it". I notice that the invitation had never to be repeated. I declined myself, at the time, as I never had much use for the stuff anyway; besides I wanted to satisfy myself that I was able to go through with what we all believed lay immediately in front of us, without any assistance from courageous John Barleycorn. The rest of the men accepted, I have no doubt, because it was against their principles to *ever* refuse a drink, and they saw no occasion for refusing then. I must explain to the unenlightened that "forty-rod whisky", is whisky so powerful, that it is guaranteed to bring down, or bowl over a man at a distance of forty rods, or 220 yards.

The head of the "enemy column", or what we supposed

was the head of the party, soon appeared, and to our surprise consisted only of three white-whiskered old men, one of whom was General W—, sitting in a spring-wagon drawn by a smart looking pair of ponies. So far as we could see, they had no rifles or revolvers. I don't believe the old boys really had anything more deadly than a flask or two of "forty-rod". Of course we did not yet know if the formidable array of desperate thugs and bloody-minded "bad" men that rumour had said General W—had in his train, was coming behind or not. As soon as the wrecked bridge had brought General W's team to a stop, Macaulay and Detective Y—jumped over the barricade and advanced, one on each side of the team, grabbing a rein apiece, and held a parley with the "enemy".

We could not hear what was said, but the gestures were eloquent, and I observed General W— attempting a display of great coolness. He took a cigar out of his pocket, bit off the end, put it in his mouth and lit it, but I noticed the hand that held the lighted match doing a lively jig. All through the affair, his aides-de-camp placidly smoked their corn cob pipes and looked so benevolent, with their long grey whiskers, that one had to laugh inwardly at the contrast between them and the deadly desperadoes that Dame Rumour had so freely and positively promised us. Truly, if these gentle-looking old men were all of General W—'s reported army of toughs, the anti-climax was ridiculous. I noticed the grey-whiskered amiable old Rip Van Winkles, as well as the doughty General himself, casting rather longing and affectionate glances towards the demi-john of whisky that Detective Y—had left on top of the barricade. Presently Y—eased the situation by pouring out a cupful and handing it to the General, who knew what to do with it, and promptly did it. Each of the other old boys also graciously accepted a cupful of the "forty-rod" and benignly stroked his whiskers, afterwards. Macaulay then let go the the reins on his side of the team, General W—swung the horses and wagon around, and the whole "army" ambled off up the road.

It looked as if our "military" careers were about over, and every man looked at his neighbour and grinned, but we were not immediately disbanded, as Macaulay did not appear to have any too much faith in the "bona fides" of General W—, and kept us all there for a week longer doing "sentry-go" in our turns all day and night. But nothing happened, and about a week later we heard definitely that General W—, had gone across the mountains to his home in Butte. The supply of "Forty-rod" having run low by that time, our "army" was ready to go home too, while I went back to my interrupted labour of shovelling gravel and washing sapphires.

THE COMSTOCK LODE.

At certain periods in the long and diversified history of mining on the famous Comstock lode, at Virginia City, Nev., the engineering problems of handling the treacherous floods of hot mine waters and the problems involved in the struggle for the financial control of the mines have seemed to outweigh all others in determining whether the workings should be carried still deeper, but even more fundamental has been the geologic problem of the persistence of the ores with increase in depth. If the rich silver ores were deposited wholly or largely from solutions that ascended from sources far below the surface deeper exploration is fully warranted. If they owed their richness to the action of descending surface waters on ores that originally contained relatively little gold and silver, then there is little to encourage deeper mining. The steady progress in metallurgy, by which more and more metal is recovered from low-grade gold and silver ores, has given large practical importance to the question of the persistence in depth or ores of this class. No thoughtful observer expects a revival of the golden and silver age of Comstock mining for the tremendous fracturing which created the channels that made ore deposition possible was more extensive near the surface than at great depths. Nevertheless, the "roots" of an ore deposit so immense are by no means small, and the Comstock operators have in recent years shown their confidence in the existence of deep lying bodies of workable ore by draining a large part of the lode to and below the 2,900-foot level.

In spite of the detailed studies that have been made of the geology of the Comstock lode very little concrete, tangible evidence has been presented to show the variations in tenor or composition of the ores far below the surface, and little information has been available for comparing the results of primary deposition with those of downward enrichment in the formation of the richer bodies of ore. Yet as downward enrichment has evidently been effective in many silver deposits a tacit belief in its potency at the Comstock lode seems to have become current among many geologists and mining engineers.

The early geologic work of King and Becker on the Comstock lode was done before the development of the theory of enrichment of ores through the agency of descending surface waters. Later observers have made only brief examinations of the lode, under conditions that were most trying because of the high temperatures in the mines. Finally, as most of the ores are fine grained, it has been impossible to determine the relations of their constituent minerals by observation with the unaided eye.

Recently E. S. Bastin, of the United States Geological Survey, Department of the Interior, has made a microscopic study of the Comstock ores and in his report published as the Geological Survey's Bulletin 735 entitled "Bonanza ores of the Comstock Lode," concludes that in the ores from depths greater than 500 feet, which include most of the bonanza ores of the lode, the silver is practically all in primary minerals. Descending solutions of surface origin produced a large increase in the silver content of certain ores obtained within 500 feet or less of the surface, yet even at these depths a part of the silver is contained in primary minerals, and some rich ores taken from slight depths showed no secondary silver minerals. Gold, so far as observed, is primary in all the ores.

Although the deeper parts of the lode probably contain no ore bodies comparable in size and richness to the great bonanzas of the past, yet the primary origin of some of the rich ores encourages deeper development.

The Wellman Seaver Morgan Company, of Cleveland, Ohio, have issued a bulletin No. 71 describing installations of car dumpers, excavators, coal and ore for handling a large tonnage of ore. Such equipment they have installed at the large plants of the [illegible] copper mines of both North and South America. Where large amounts of ore must be handled cheaply, and where ore reserves warrant permanent installations, machinery such as this is a necessity.

A New Explosives Plant

NORTHERN EXPLOSIVES LIMITED, DRAGON, QUE.

The success of the Disarmament Commission at Washington will, we presume, force us to "scrap" the trite but nevertheless true old saying, "In times of peace prepare for war." However, the underlying idea,—to take advantage of periods of depression to prepare for happier and busier times—is just as sound to day as ever, and fortunately for the country there are those who not only realise this truth, but have the courage of their convictions.

The present activity at Dragon, Que., is therefore of more than usual interest to Canadians, because at this place some of the more courageous and far-seeing leaders of our basic industries are giving outward and visible sign of their faith and belief in the better times in store for themselves and for Canada generally, by having completed the most modern High Explosives plant on the Continent. This plant is of peculiar interest to Canadians, as it is the first built and designed by Canadians, for Canadian trade and conditions, under the new Canadian Explosives Act just in force.

The Northern Explosives plant is now operating, and has a capacity of approximately 5,000,000 pounds of commercial (disruptive) explosives per year. It has been so designed and built that this output can be largely increased without major alterations being necessary. The growing importance of our coal mining industry has not been overlooked, and provision has been made for the manufacture of "Permitted Explosives" when desired.

The recent visit which the writer paid to Dragon recalled old memories of the War,—memories of great difficulties overcome,—whole-hearted work and feverish activity to make refined TNT., which is one of the most destructive war explosives known. The whole atmosphere had, however, changed, and a plant devoted to peaceful industry had already risen, Phoenix-like, from out of the ashes of the old buildings. The number of returned men contentedly at work added not a little to the effectiveness of the picture.

Location

Practically everyone at some time has travelled between Montreal and Ottawa via the Canadian Pacific, but few realise the extent of the Company's site. The property (of about 500 acres) extends from the Ottawa river southward to the lower edge of that geologically interesting old worn-down ridge known as Rigaud Mountain. It would take a Washington Irving to do justice to the "Devil's Garden", and practically every McGill Science graduate has at some time listened in silent rapture to the words of wisdom of the lecturing professor, who, however, differed from local authority as to how the stones grew so abundantly there.

The property is naturally divided into three portions by the main Montreal-Ottawa road, as well as the C. P. R. short line. South of the road is an attractive industrial village, complete with hospital, store, school, inn, and about thirty houses, with good roads, sewerage, electric light, and pure spring water. In addition to the well laid out houses, ball grounds and other facilities for amusement are provided. Golf course and movie theatre are also being considered.

Between the main Montreal-Ottawa Highway and the railway are the administrative building, chemical laboratory, change, lunch and rest houses, while north of the track are the factory buildings proper. This section of the property is again naturally divided by a rise in the ground or a "Petit Cote" or hill running approximately east and west. Full advantage has been taken of this feature to separate the actual explosive manufacturing buildings or "Red Area" from the balance of the plant, known as the "Green Area".

Another feature of importance is that, being between the Rigaud Mountain and the Ottawa River, a plentiful supply of cold spring water is constantly available. The purity and low temperature of this water are particularly valuable to a Nitro Glycerine plant.

Lay-out and Construction of Building

The "Red Area" consists of the following units or departments:—Nitrator, Expense Magazine, Wet Gun Cotton Store, and three complete Powder lines running at right angles to the other units. The Powder line buildings are completely equipped with the most modern machines for the corporation, mixing and cartridging of all the different kinds of explosives used by mines and quarries. The railroad blasting explosives are manufactured in a separate unit. Full advantage has been taken of the experience gained during the war in the handling of explosives, and all machinery has been specially built for this plant.

The following brief description of a typical building will, it is thought, be of interest here. The official license from Ottawa calls for:—

"Red Area" buildings being lightly constructed of wood lined throughout with closely joined tongue and grooved square edged wood. Floor,—closely joined wood covered with Rubberoid up to about 18in. inside walls. Roof,—lightly constructed of wood covered with metal shingles. Track shed,—lightly constructed of wood studding covered with corrugated iron.

Among the more noticeable safety features are:—

Wooden rails by each building;

Doors opening outward;

No steel locks, catches, window fasteners, etc.;

Rubberoid covered floors, with this material coming well up the walls;

All corners rounded, to prevent any collection of dust.

Another interesting feature is that each working building is provided with semi-clean area, or change platform, through which everyone must pass when entering or leaving the building. Ample provision has been made for safety shoes, clothing, etc. Each building is devoted to one operation, and all the buildings are separated one from the other as called for by the "Table of Distances" as authorized by the British and Canadian Governments. They are further protected each from the other by the wooded nature of the land. In short it is thought that every precaution has been taken to render this area as safe as possible. Nothing known to modern science has been omitted to attain this result.

The Heating Problem

Heating is a big problem for every factory,—especially so for Canadians, and more particularly so for an Explosive building where indirect heating is of course absolutely essential. Every other system has far too many serious and obvious faults to permit of their use. The almost irreconcilable factors are.—

Greatest possible degree of safety;
High efficiency;
Low capital and maintenance costs.

Much work was done on hot air furnaces with thermostatic control, but there are still many difficulties to be overcome before this system is sufficiently safe. It has many good points, however, and deserves further study. Eventually an independent heating unit was worked out which did away with all metal in the working buildings, as well as all connecting pipe lines. Each unit is housed in a building of its own close to the working room to be heated. It consists of a water-jacketted heater contained in a room by itself. The radiators are in another room, and consist of a stack of "Vento" coils. These coils are jacketted, and the air intake end screened. The air is sucked through these coils, and gently blown into the working room by a fan directly coupled to a 5 h.p. single phase motor. The air ducts in the working room are so designed as to prevent any dust being raised or to allow any particles of what might become explosive matter to get into the air chamber. Glass windows are provided in the air ducts, for inspection and cleaning. An additional advantage of this system is that the working building is both heated and ventilated, ensuring the most healthful working conditions possible.

Nitrating and De-nitrating

One of the most important buildings in an Explosive plant is the **Nitrator** building, while the Nitrator itself may be said to be the heart of the works. Sobrero, Professor of Chemistry at Turin, discovered Nitro Glycerine in 1846, but the nitrating of even a few pounds of glycerine was attended with much danger.

Constant work during all these years and more particularly during the years of the war has done much to overcome the initial difficulties and dangers. It is thought one can safely say that modern methods have now almost if not entirely removed this element of danger.

The Nitrator is of the "Hough" type, taking a charge of 1500 lbs. of glycerine and approximately three to ten thousand pounds of mixed acids. The characteristics of this apparatus are its mechanical agitator, large cooling surfaces and safety devices whereby the supply of glycerine is automatically cut off in case the agitation ceases or becomes sluggish from any cause. These and other features, while of intense interest to powder men, are of too technical a nature for further comment in an article of this character.

The Nitrator building itself is built to stride out on to the far, or north side of the hill already mentioned. In addition to the protection thus afforded it is still further safeguarded by a barricade of substantial design.

The separation of the Nitro Glycerine from the used acids, its washing, purification, filtration, etc., are also of great interest. The most modern practice is followed, and will be the subject of a separate article at a later date.

An unusual feature is the inclusion of the Denitrating unit in the "Red Area". This is regarded as a distinct innovation, and was not considered necessary in the past. The policy of the Company throughout however, has been to put safety of operation first, and to work in the closest possible way with the Explosives Division at Ottawa. In view of the fact that explosions have occurred in Denitrating units handling spent acids from glycerine, it was therefore thought best to include this unit in the "Red Area".

The Denitrator consists of a tower of special acid-resisting metal with suitable spiral packing, together with the necessary condensers, pumps, pulsometers etc. The spent acids containing traces of Nitro Glycerine enter the tower about two-third of the distance from the top. The temperature is so controlled that practically the moment the acid enters the tower the N. G. is decomposed, being given away and possibility whatsoever of even the most minute traces of this dangerous compound getting into the pipes or condensers. The Powder Specialty Company of New York supplied the specially designed Superheater which raises to the proper temperature the steam which enters the bottom of the tower. Ample surface and capacity are provided in a battery of six existing towers. Suitable acids and low operating costs are confidently expected by this system. The returned acids are returned to the Acid Plant in the "Green Area".

The Explosive Magazine and Gun cotton store are also built into the side of the Hill, and are very interesting in themselves do not call for further comment.

Every building in the "Red Area" and in fact every part of the plant, is served by a 30in. gauge light railway which connects with the main C. P. R. line. An electric locomotive equipped with E.I. storage batteries is used, and the lines laid out with easy curves and the grades so handled that a motor truck is a practical impossibility along the line. Board walks are provided connecting all the buildings so that the minimum of dust or dirt is encountered.

Vacuum Acid Plant

The Acid Department is the centre of interest in the "Green Area" and the advancement in the strength of the making and concentrating of acids due to war [illegible] particularly noticeable. The Nitric and Sulphuric Acid units are the most modern of Canada, and were designed by and built under the supervision of Arthur Hough, Esqr. the well known consulting chemical engineer of New York City [illegible] Nitric plants have capacities of many tons [illegible] Mr. A. Hough of Montreal who in '95 A.D. [illegible] and Charles Dickson who in 1901 [illegible] the well known formula for the [illegible] would like to say one word more [illegible] and most comfortable type of vacuum plant [illegible]

While there are many [illegible] the Sharples [illegible] the best [illegible] Canada and using the most [illegible] material in the construction [illegible] and the economy in maintenance [illegible] which permit a development [illegible] special features worked out [illegible] system is thought [illegible] "Hough" type of coils [illegible] pairing pairs are designed [illegible] to be removed. Air [illegible] temperature and help reduce [illegible]

minimum, but enable the operator to get a high yield of strong acid with practically none of the lower oxides. From the still, the vapours pass through suitable condensers having a total length of approximately 300 ft. Remaining gases then pass through absorption towers, where they are collected. The final exhaust gases show only the slightest trace of nitrogen oxides. By reason of the reduced pressure the temperature at which the sodium nitrate is decomposed is unusually low. The efficiency of plant is estimated at or near 99 per cent of theoretical,—75 per cent of the acid should average about 96 per cent, and four charges per 24 hours can be run.

In order to economise in labor, the Sulphuric Acid concentrator is contained in the same building as the nitric plant. The whole recovery system is very compact, consisting as it does of a tower filled with spiral packing connected to a concentrating pot of special design. The pot is set in brick and so designed as to be heated on all sides from a Dutch oven which is part of the brick work. The incoming dilute acid passes down the tower where it meets the ascending hot sulphuric acid and other vapours from the pot, absorbing them, and at the same time being partiallly concentrated. This acid then passes into the pot. The highest thermal efficiency is obttained by making use of heat transfer apparatus. 72 hour Solvay coke is used, and the fuel consumption is low when the capacity of the plant is taken into consideration.

This whole system is intensely interesting, but is of such a technical nature that for further particulars the advanced text books on American sulphuric acid practice should be consulted.

The other buildings and departmenta in the "Green Area," namely the Dope House (where the sodium nitrate, ammonium nitrate, wood meal, etc. are dried and mixed), shell making house, &c., do not call for particular mention.

Power, (3 phase, 60 cycle, 2200 volts,) is being taken from the Western Quebec Company, and is stepped down to 550 and 110 volts,—in addition to which an auxiliary steam-driven electrical plant is connected to all motors. A special and independent line is run to the Nitrator. It is thought in this way to absolutely guarantee continuous power when nitrating.

The President and Directors of the Company are all prominent in mining, quarrying and contracting circles. The Managing Director is George C. Riley, Esqr., who has been actively engaged in the explosives business for many years. It will be remembered that previous to the war Major Riley was a director and sales manager for Messrs. Curtis's & Harvey, and he has succeeded in surrounding himself with a great number of his old men who have been making explosives on this same spot for the past 15 years.

The completed plant is of exceptional interest, and reflects the greatest credit on the management and Lt. Col. G. Ogilvie, C. M. G., the Chief Inspector of Explosives at Ottawa, who has kept continually in touch with the work. In fact the closest possible co-operation and harmony have existed between the Department and the works.

The writer desires to express his thanks to the President and Directors of the Company who are permitting the publication of this article,—also to Mr. Hough, the well known consulting engineer, and to Mr. Riley and Mr. V. P. Row, the Company's Engineer, for the information and courtesies extended him by them while at Dragon.

NOTES FROM SAULT STE MARIE

The Soo is full of prospectors and potential prospectors. There has been extensive staking in the Goudreau gold district. Developments on the Murphy claims under C. A. Foster have shown up some spectacular ore, with the usual consequent wave of excitement. There seems to be in this case, however, something more solid to build upon than a small bunch of very rich ore. It looks as if there were in addition a large body of ore of fair gold content. Capital is coming in pretty fully and in some cases at least on the sound basis of actual development work as a first-hand expenditure, without the too common expedient of company flotation and stock peddling.

Exploration for iron ore has been going on during the last year. There are properties along the Algoma Central Ry., north of the Soo, known for a good many years, but not sufficiently investigated. An attempt is being made to try out some of these, so as to settle the question as to the existence of ore in quantity.

REVISION IN BASE PRICES OF MONEL METAL

The International Nickel Company of Canada announce a revision in base prices, to be effective from April 1st, 1922. Schedules showing size and quantity differentials will be sent upon request.

(Note—All prices .O.B. Port Colborne, Ontario.)

Sheets Hot Rolled.—Lots of 1000 lbs. and over of a gauge, 48c per lb. Lots of less than 1000 lbs., of a gauge, add 1c per lb.

(Superseding base price of 58c per lb.) (No crating charges on sheets.)

Rods, Hot Rolled—42c per lb. (Superseding base price of 44c per lb.)

Rods, Cold Drawn, 53c per lb. (Superseding base price of 59c per lb.)

Rods Machined, 50c per lb. (Superseding base price of 55c per lb.)

Shot, (Foundry Metal), 34c per lb. (Superseding base price of 37c per lb.)

Blocks, 34c per lb. (Superseding base price of 37c. per lb.)

Ingots, 40c per lb.

The McCumber Tariff Bill, presented before the United States Senate on April 11, contains items that will affect Canadian mineral exports. There are distinct differences between the Underwood tariff, which became law in 1915, the proposed new tariff, and the Fordney Tariff which is still before the Senate. Some items follow:—

	McCumber Bill 1922	Fordney Bill 1921	Underwood Law 1913
Molybdenum (lb.) . .	.75	.75	free
Tungsten ore (lb.) . .	.45	.45	free
Zinc ore, over 25% zinc (lb.)	.01½	.01½	10%
Crude magnesite (lb.)	5-16	½	free
Calcined magnesite lb.	⅝	¾	free
China clay (ton)	$2.50	$2.50	$1.25
Fluorspar (ton) . . .	$5.60	$5.00	$1.50
Talc (Soapstone) lb. .	¼	¼	free
Graphite, amorphous %	10%	10%	free
Graphite lump % . .	20%	10%	free
Graphite, flake (lb.)	.02	10%	free

News and Comments

By ALEXANDER GRAY

Tough-Oakes Resumption

The mine that can withstand what the Tough Oakes was subjected to, and survive, deserves the respect and good-will of all. No one, therefore, will begrudge to the company a measure of prosperity, now that milling has been resumed and the properties have re-asserted themselves. No doubt the experience gained will be an added source of profit. The present management has shown it could meet a complicated situation, and Mr. Goodchild, a geologist of note, has pointed the way toward a sound development.

> "In the two-mile stretch there is a continuous line of prosperous mines. These mines are in their first youth, for at present they are only opened up to quite shallow depths. The character of the lode formation, to give it a common but not strictly accurate name, is such as to give confidence that the gold will live down to great depths. Further developments in the lower levels are in distinctly higher grade ore than those at the higher horizons. The Kirkland Lake field has always been noted for the high grade of its ore deposits, and, with lower horizons yielding even higher grade averages than the upper, it is impossible to forecast at present whether the limit of enrichment in grade has yet been reached. One thing is certain, namely, that in this field there is a tendency for the ore bodies not to disclose their best values on the outcrop, as is commonly the case in most mining fields"

By direct statement, and by inference, Mr. Goodchild furnishes inducements for capital expenditure under expert direction. The risk may be taken by those who can afford to lose and who deserve to win.

Mr. Raney's Stock-Selling Regulations

Solomon in all his glory had nothing on the Commissioner to be created under the Raney Act for the regulation of stock selling. The Commissioner is to pass on the regularity of the incorporation, the prospectus, but not the prospects. Pedigreed Mining Engineers clothed with Provincial Certificates that they are such, no doubt will guide aright promoters and capitalists in order to obtain the requisite sanction to sell shares. It is not the intention to restrict capitalizations. Where the letter of the law is complied with, the duties of the Commissioner will be obligingly ministerial. Anyhow, perverse human nature understands a coach and four can be driven through most statutory enactments.

Consolidating "Domes"

Barnato used to prescribe as a formula "reorganization, amalgamation, liquidation". That may or may not have a bearing in the matter of the consolidation of the Dome Lake Milling & Mining Company and the West Dome Consolidated. It is too early to formulate an opinion in the premises. How much capital will be written down or whether the dollars shares will be made \$5 shares, and what the public will be required to pay, will govern popular estimate of the "consolidation". Were it not that "certain of the directors" were "sick" last month, the launching might have been under way and a trial run given interested "bidders".

Ali Baba Literature

A Montreal firm of "specialists in Canadian mining shares" appears to be aspiring to a sudden departure, according to this "special bulletin" announcement:

"Hollinger is to-day undoubtedly the premier Canadian Gold Mine, and should before many months become the leading gold producer of the world. Expert engineers have reported that the company has practically *forty years'* supply of gold at *present* rate of production *blocked out*, which should run equal to if not higher than the present millheads of \$9.00 per ton".

On what meat do these "mining Caesars" feed?

Is Burma Out Of It In Zinc?

The metallurgy of Burma Corporation has been reported on by Mr. E. P. Mathewson with a frankness that makes it look very promising for Trail zinc output. For ever so many years the brightest mining and metallurgical intellects have been devoted to those Indian ores, so high-grade that regular processes are intolerably wasteful. Not being amenable to known processes, current practice repeatedly had to be changed in order to better recoveries. Separations, special arrangements for silver and lead smelting and zinc retorting, have left the latter where Mr. Mathewson says, in effect: "Forget it". The influential administration will not stop there, because it cannot. Too much is at stake, and too much money is involved. Meanwhile Burma is not apt to bother Consolidated Mining & Smelting markets for zinc to the extent anticipated. Broken Hill, of course, has to be reckoned with.

The Aching Void

Not a thought is given by daily newspapers to the weakest link in Canada's industrial chain as exhibited in this partial list of natural mineral products in 1921 showing a value more than \$1,000,000.

Coal	\$71,273,000
Gold	21,324,000
Silver	9,185,000
Copper	7,159,000
Nickel	6,759,000
Natural gas	6,[illegible]2,000
Asbestos	1,807,000
Lead	3,[illegible]0,000
Zinc	2,[illegible]8,000
Gypsum	1,[illegible]5,000
Salt	1,[illegible]1,000

Is Iron Mining among the lost arts [illegible]? If not, it is not far removed from the vanishing point outside the Wabana section. Why not annex Newfoundland, if for no other reason than to enable it to have iron ore in the million column? Or should we rather remain somewhat overelated? [illegible] per cent. of the total of mineral products represented by coal, and iron data freezing the [illegible] makes it imperative that Canada become an Industrial Nation, and lose no time in doing it. [illegible] the tail of the bird, but we really need [illegible]

Northern Ontario Letter

THE GOLD MINES

Hollinger

One of the more important incidents of the past week in connection with mining in the Porcupine district is an action by the Northern Canada Power Company, which constitutes formal notice that the power company will endeavor to enforce a contract to supply the Hollinger Consolidated with its power requirements for the life of the mine. It will be recalled that the Hollinger took action some months ago against the power company for alleged damages of about $1,800,000 but the decision of the court was against the Hollinger. The latter company appealed the cease, and this appeal is now pending. In the meantime, the Hollinger has been negotiating for rights to develop energy on its own account on the Abitibi River and this is believed to be the cause for the action now being launched by the Northern Canada Power Company.

Goldale

During the third week of April, the Lewisohn interests commenced the work of pumping out the shaft on the Goldale property at Porcupine. It is planned to continue the shaft from its present depth of 150 feet and to also employ diamond drills for the purpose of locating, if possible, the easterly continuation of the mineralized zone which runs in that direction across the McIntyre-Porcupine.

Porcupine V. N. T.

Work of de-watering the Porcupine V. N. T. is progressing satisfactorily, and by the middle of May the entire North Thompson side should be in shape to resume mining. The mining plant is in first class condition and will serve to carry work to a depth of at least 1,000 feet. The enterprise gets its new start under exceptionally favorable circumstances. The management has the advantage of having this mining plant immediately available, as well as having a mine which is even now estimated to have over half a million dollars worth of ore in sight, and developed to a depth of 600 feet. In addition to this there is a mill on the property which is good for 100 tons of ore daily and could easily handle 150 tons daily with an expenditure of approximately $40,000 on alterations and additions. We may expect the addition of another profitable mine in the Porcupine V. N. T.

Good One at Peninsula Mine

Among the more favorable reports coming from the newer sections of the gold districts of Northern Ontario, is advice obtained officially by the Journal from A. R. Globe, manager of the Peninsula property, situated at the north-east side of Night Hawk Lake. This is within the Porcupine Mining Division, although fifteen miles straight east of the older developed area. Mr. Globe who was formerly assistant manager of the Hollinger made the announcement to the Journal representative that at a depth of 200 feet, a drift has been driven for 150 feet, and carefully channelled samples show an average gold content of over $14 per ton across a width of 20 feet. In addition to this, the diamond drilling formerly done has indicated a body of ore assaying $5.70 across a width of 30 feet, and over a length of 500 feet as so far tapped by diamond drills at intervals of every 50 feet. Another body has a width of approximately 27 feet and assays $4.80 per ton. Up to the present, this property has been quietly operated, not a great deal being said apart from the brief official announcements in these columns. However, a total of about 1000 feet of underground work has been done, in addition to 2,800 feet of diamond drilling. It is a point of importance that the geological structure is entirely favorable, there being basalt and porphyry formation, and the structure being of the right sort. These facts, coming from a thoroughly reliable mining man such as Mr. Globe, would tend to show that the enterprise is an important gold mine in the making. It is also announced that the consolidation of the Peninsula property and the Night Hawk Lake Mining Company is being completed and that the consolidation will be known as the Peninsula Consolidated Night Hawk Mines, and the company will hold approximately two miles in length of this gold belt.

Dome Mines

Dome Mines will pay dividends at the rate of 25 cents per share quarterly instead of 2½ p.c. quarterly. This means that as the par value is reduced with each capital repayment, the current dividend rate from a viewpoint of percentage return will gradually increase. By the time the stock is reduced to $1.00 par value as against the present par value of $9.00, the dividend of 25 cents quarterly will be at the rate of 100 p.c. The president of the Dome, Mr. Baehe, made the statment this week to the Journal representative that this policy of capital repayment will probably be continued until the par value is reduced to nil. This will leave the shareholders with stock of no par value, and the profits will be distributed on a basis of so many dollars per share annually. The company has recently been making net profits at the rate of $2,000,000 a year, the indicated income for the first three months of the year having been around $950,000, with an indicated profit of $500,000 for the quarter. This indicated net profit is actually at the rate of about $4.20 per share annually.

Gold Reef

Reports are current that the control of the Gold Reef may be so placed as to assure operations being commenced within a reasonably short time. The company is said to have sufficient money in the treasury to finance a considerable amount of work, as well as having around 1,000,000 shares in the treasury.

Holtyrex

A diamond drilling machine is being taken in to explore the property of the Holtyrex, situated to the north of the Plenaurum. The promoters of the company believe they can locate the continuation of part of the mineralized area that passes over the McIntyre.

Allied Porcupine

A deal for the Allied Porcupine property is said to be under negotiation and would provide the company with working capital of about $75,000. Nothing definite has been ascertained at the time of writing.

South Keora

The work of raising finances for the South Keora is proceeding satisfactorily and it is expected the resumption of work will take place this spring.

Harnessing Sturgeon Falls

Construction work in connection with the harnessing of Sturgeon Falls by the Northern Canada Power

Company is proceeding at a good rate and the indications appear to be that this additional 6000 or 7000 horsepower will be available for the Porcupine mines by the end of th current year, as planned.

Power on Abitibi

The power situation with respect to the distribution of the right to develop energy on the Abitibi River for industrial use in the Porcupine gold area, the Abitibi Power and Paper Company's operations and the T. and N. O. Railway has been practically settled.

The Hollinger Consolidated will in all probability be given the right to proceed with hydro-electric development at a point below the Long Sault Rapids where it is estimated a total of approximately forty thousand horsepower may be developed. The one remaining point to be decided has to do with regulations in connection with the control of the storage at the head of the river. This is now controlled by the Abitibi Power and Paper Company and has been brought about at considerable expense, which fact has led the Abitibi interests to demand compensation. At the same time, those who are to develop below the Long Sault are negotiating for a voice in the manner in which the storage will be controlled. This request has been occasioned by the fact that it is the present policy of the Abitibi to conserve the flow of water on Sundays, a policy that would not fit in with the generation of power at points lower down where a steady current would be required every day of the week for the purpose of keeping milling operations going at normal rate.

Satisfactory precautions and reservations have been made for the electrification of the T. and N. O. Railway at some future date, and the indications appear to be that any further delay in the commencement of actual construction will be short. It is understood that Premier Drury has suggested that a committee of engineers should get together and bring in a report. These engineers are to be representative of the Hollinger Consolidated, the Abitibi Power and Paper Company and the T. and N. O. Railway and there is every reasonable assurance that the findings of the committee will be such as to bring about a condition under which the Hollinger may proceed with whatever development plans the company has in mind.

Hunton-Kirkland

The proposed merger of the Hunton Kirkland with the Munnaker Kirkland was ratified at a meeting on April 19th at which a vote of the Hunton stockholders was taken.

Teck-Hughes

Rumors are current that the Teck Hughes and the Orr Gold Mines are negotiating with a view to forming a consolidation by selling the Orr to the Teck-Hughes. Some doubt is thrown on the suggestion for the reason that Hamilton B. Wills, one of the leading interests in the Orr, is still absent in Europe and will not return to Canada until some time in May. However, it is generally conceded that a consolidation of these two properties would be the logical procedure.

Argonaut

From end to end of the Kirkland Lake field the reports from the producing mines are exceptionally favorable. In addition to this, the outlook for a number of the properties in the development stage continues to improve. This condition exists all the way east as far as the Argonaut Gold, where a contract for the construction of a mill is just being let. This property is developed now to a depth of 500 feet.

Lightning River

A plan is under negotiation whereby the Lightning River Gold Mines Company hopes to sell about 800,000 treasury shares, which sale would place the company in shape to carry out a development campaign on its promising properties.

Bourkes

Arrangements have been made to operate the Bourke's Mines. The preliminary work is under way and the plan includes lateral work at the 400 ft. level as well as considerable diamond drilling.

THE SILVER MINES

McKinley-Darragh

Reports reaching Cobalt this week bring the information that the McKinley Darragh is considering the question of resuming operations in May. No official statement has been issued as yet, however.

The increase in the price of silver to over 69 cents an ounce is an important factor in relation to the possibilities of certain of the idle Cobalt mines resuming work.

Beaver

At the annual meeting of the Beaver Consolidated it was announced that the mine would not be reopened at present. It was also stated that the Beaver had sold a limited number of shares in the Kirkland Lake Mining Company, for the purpose of providing working capital.

A sustained high price for silver might reasonably cause the Beaver Consolidated as well as the Temiskaming mine and the Kerr Lake to reconsider their decisions to remain closed.

Nipissing and Rochester

Guesses are being made in Cobalt as to what the Nipissing will do within the next two months, when its option on the Rochester property at Porcupine must be exercised or dropped. The officials remain reticent.

Victory Silver

Some time during the last half of May the shaft on the Victory Silver Mines should be completed to a depth of about 175 feet. This will be closed to the underlying diabase which is estimated to be at a depth of about 525 feet. After cutting a station at the 175 ft. level, lateral work will be commenced for the purpose of tapping the downward continuation of the veins opened up at a depth of 150 feet as well as a vein which passed through the shaft at a depth of about 300 feet. The feature of this new work is that the vein will be opened up at a point within less than 100 feet of the underlying contact. It is important to keep in mind that on the nearby Temiskaming mine it was in that area lying within 100 feet of the contact that upwards of 70 per cent of the silver was encountered.

Bonsall

An official has been made by authority of creditors' report about the Bonsall property to date the O'Brien Company into a controversy. The O'Briens having refused to be drawn in detail [illegible] continue to stand their report to be correct. The facts are however that the details given [illegible] in the Journal are authoritative and correct. The O'Briens have controlled the Bonsall for 2 [illegible]

News of Mining

In what seemed to be defective zinc oxide from a United States paint works, germanium sulphide has been identified. The pharmaceutical qualities of germanium oxide are reported to be superior to those of arsenic trioxide. The germanium sulphide was at first mistaken for sulphur. It was identified by Professor Taggart of the University of Pennsylvania.

From by-product coke ovens in the United States the estimated recoveries per ton of coal charged during 1920 and 1921 were:—Ammonia (sulphate or equivalent) 21.4 lb.; tar, 8.2 gallons; crude light oil, 2.7 gallons, and gas, 10.8 thousand cubic feet. Gas production during 1920 amounted to 308,000,000 thousand cubic feet, of which about 10 per cent. was used in steel or affiliated plants, 20 per cent. distributed through city mains and 10 per cent. used under boilers, etc. Motor fuel production exceeded 55 million gallons, and benzine exceeded 16 million gallons. Other products were crude light oil, toluene, solvent naphtha, and naphthalene. About 7 per cent. of all coke made was sold for domestic and kindred uses.

A proposal to tax imported silver and place a corresponding bounty on exported silver was rejected recently by the Legislative Assembly, Delhi, India.

The unfavorable exchange situation, increased cost of labour and higher prices of coal have led to the very serious development of vast peat deposits in the Lago District, Italy. The deposits are situated at an elevation of 4,000 feet above sea-level. Italy's domestic production of lignite amounts to about 1,125,000 tons annually, whilst the outputs of bituminous and anthracite are almost negligible.

Railway freight rates in Germany were increased by 40 per cent. on April 1st by the German Ministry of Transport.

In South, Middle and East Germany the development of electrical power is based upon the utilization of brown coal and lignite. In Saxony a State owned 200,000 horse-power electric station is in course of erection. Only brown coal will be used in generating this power. At another plant near Bonn, 8,000 tons of lignite are burned daily under 24 boilers. In most cases power from brown coal is cheaper than hydro-electric current.

It has long been known that iridium occurs in the banket reefs of the Rand. In the mill concentrates the presence of the platinum-group metals has sometimes caused inconvenient errors in assay results. Lately pure specimens of iridium, osmium, ruthenium, rhodium and platinum have been prepared and steps are being taken to provide for their regular recovery.

The Tata Iron and Steel Company, Jamshedpur, India, possesses 25 square miles of territory. Its pay-roll contains no less than 35,000 names and involves a monthly disbursement of approximately $250,000. When numerous projected and organized subsidiary companies shall have begun operations the population of Jamshedpur will reach the figure of a quarter of a million. The last census returns gave the population at 71,000.

The recovery of coal and coke from ashes and cinders is engaging much attention in Great Britain and the United States. In one recent test of the ashes from a large industrial plant it was found that they contained 57.8 per cent. combustible matter. Treatment by oil-flotation showed a recovery of 47 tons of coal (containing 15.2 per cent of ash) from every 100 tons of ashes.

The world's output of tin is estimated at 93,813 tons for the year 1921, as against 118,111 tons for 1920. Cornwall's production fell off to only 700 tons as compared with 2,900 for the preceding year. A large falling off is also reported from Bolivia, the figures for 1921 being 17,698 tons as against 29,540 tons for the previous year. F. M. S. tonnage was the highest item 34,446 tons, which was practically identical with the 1920 output.

The latest investigations of the bonanza ores of the famous Comstock Lode, Virginia City, Nevada, have brought out some interesting facts. Microscopic study of specimens obtained at depths of from a few hundred feet down to 2,900 feet, show that below 500 feet in most of the bonanza ore the silver is contained by primary minerals. Above 500 feet descending solutions have increased the silver content of certain ores, yet part of the silver at those shallow depths is still primary. Gold, so far, as is known, is wholly primary in all cases. The primary origin of the metals encourages the idea of deep development. The heated ascending solutions of the Comstock system are chiefly calcium and sodium sulphate solutions.

Reports indicate that, owing to lower prices of coal, the use of oil fuel in the United Kingdom is growing less. At many plants where a change from coal to oil was contemplated, the change is not being made. On the other hand, the owners of oil-tankers are complaining of ruinously low freight rates.

Whereas by-product coke outputs in the United States declined 35 per cent. during the year 1921 (as compared with the year 1920), beehive coke outputs receded 73 per cent.

According to a report on the Laws and Regulations relating to Lead Poisoning, prepared for the Governors of the Imperial Mineral Resources Bureau, London, Eng., special restrictions are imposed by law on employers of labour in lead smelting, etc. in most mining countries. These restrictions relate to the prevention, removal, and laying of dust and to the cleanliness and medical examination of workers. In Canada, for the most part, prevention of lead-poisoning is left to employers, no special regulations being in force. The Consolidated Mining and Smelting Company, Trail, B. C., it is noted, enforces rigid sanitary rules.

Hydraulic Sand Packing for Mine Workings

By E. SCOTT RIVETT,

(Member of The Junior Institution of Engineers, London, England.)

The news that the Hollinger Consolidated is proceeding with the construction and installation of equipment for sand-packing is causing a good deal of interest among the mining-engineers of Canada, where the hydraulic method of stowing has not hitherto been greatly used.

The Hollinger scheme, as reported in the daily press, is to deposit sand from milling operations back in the mine, thereby replacing the ore taken out, and thus partially relieving the necessity of finding place on the surface to deposit some thousands of tons of sand daily. The advantage of the scheme, underground, is that in filling up the present excavations the closely adjacent ore deposits may then be safely taken out, whereas at present such could be accomplished only with considerable danger to the miners.

The idea of packing old mine workings is not, of course, a novelty, as many mines, notably coal-mines, have been forced to use this practice, sometimes owing to the thickness of the coal seams, in other cases in order to prevent surface subsidence, which may be a matter of first-class importance in some districts. For these reasons hand-packing or stowing has been resorted to, and various materials, such as crushed rock and gravel, washer refuse, ashes, clinker, broken furnace slag, etc., have been used for this purpose. It has been discovered, however, there are advantages in flushing this filling-in material through pipes into the mine by means of water. On leaving the pipes the solid material settles out, and when this reaches the roof it forms a packing capable of supporting the overlying strata. The best material for such hydraulic packing is sand, and in localities where a large quantity of suitable sand is available, such as in parts of the Saar Coalfields in Germany and the Central Coalfields of India, the hydraulic method is now in use in a number of collieries.

The cost of working on this method is not appreciably higher than with hand stowing, while the saving of timber is considerable and there is less danger of mine fires. The Coalfields Committee have recommended the Government of India to make hydraulic sand stowing compulsory in certain cases.

The general plan—a gravity system as used in the Indian coal mines, was recently described in a paper read by Mr. R. H. Squire before the Junior Institution of Engineers in London. Dry sand is handled on the surface. It is transported, either by tramway haulage or roadways, from the river bed to the point at which it is to be flushed into the mine, and then discharged into a storage bunker. On leaving the bunker the sand is mixed with water and flushed down into the mine. The flow of sand from the bunker is controlled by a hand-operated slide, and falls into an inclined mixing trough. The water supply, controlled by a valve, is led into the upper end of the trough and the mixture of sand and water discharges into a small feed hopper fixed to the pipe which leads down to the workings to be stowed. Telephone communication is usually provided between the man in charge of the sand and water supplies and the workmen in the area to be packed. The chief difficulty in India is to ensure a regular and sufficient supply of sand, but this trouble should not be serious at the Hollinger.

In designing the flushing system the first consideration is the minimum average gradient at which stowing must be done. If the pipes are well laid, in long straight runs, with only two or three easy bends, this may be taken approximately as:

$$\text{Average slope, } S = \frac{H}{L}$$

where H = total available head, and L = total length of pipe. If, however, H is small, or if there are a number of short bends on the pipe line, then H must be taken as the difference in level between inlet and discharge, less the sum of head lost (as determined by Hagan's formula) at the inlet, at the bends, and on the discharge. In every case L must be taken as the total length of piping from the feed hopper to the point of discharge. As a general rule it may be said that if S is less than .12 for small plants or .105 for large plants the gravity system is impracticable, and unless these figures are considerably exceeded, the efficiency will be low, as an excessive amount of water will be required.

Another point, to be considered in conjunction with the minimum average gradient, is the amount of sand required and the rate at which it is to be fed into the workings. These two points will determine both the size of the pipe required and the percentage of solids that can be allowed in the mixture.

Mr. Squire remarked on the scantiness of data bearing on the percentage of solids which may be put down on any given grade without risk of choking the pipe, and made several experiments with clean river sand, of which 80 per cent passed a 30 mesh sieve. The results of these experiments are embodied in a diagram which show solids allowable on various slopes, and also show what size pipe line will be required to deliver a specified quantity of sand per hour in any given case, and also how much water will be required for flushing. It may be noted that the quantity of water should allow for 75 per cent voids in the volume of the dry solids, and if this is not allowed for it will be found that, measured by volume, more water remains than was intended.

The mixing trough, properly arranged, provides a means of regulating the percentage of solids and making the system fairly flexible. The trough must not be made too short and too much speed is undesirable at the delivery. It should be fixed at the upper end of the pipe, with its bottom level, and it will be found that an increase in sand above the normal desired must be met by an increase in water, the normal desired must be met by an increase in water, the normal desired must be met by an increase in water, [illegible] and as this is [illegible] under the conditions [illegible] can be arranged [illegible] One point [illegible] by Mr. Squire [illegible] the mixing trough [illegible]

[illegible] Hollinger [illegible] as an illustration of the [illegible] of the diagrams referred to above. In one [illegible] coal was originally flushed down a 9-in. pipe at [illegible] inclination. [illegible] a horizontal length of [illegible] 1,300 ft. The consumption of water [illegible] per ton of sand. The arrangement [illegible] fairly satisfactory, and as more [illegible] put down and the length of pipe [illegible] reduced

to 700 feet. The proportion of water to sand improved to 1.16 to 1 (46.4 per cent. solids), and the velocity of the flushing material in this case was 24.3 feet per second. The angle of dip is small, and if we take this as averaging 1 in 25, we find the average gradient of the pipe line in the first case works out at about 6 per cent. and in the second case nearly 28 per cent. Turning to the diagrams, it will be seen that the first case comes below the safe limit, and that stowing was possible at all is probably explained by the fact that clay was mixed with the sand. The second case comes well above the safe limit, and it would appear that more water is being put into the mine than is necessary.

It is highly probable that a small proportion of slimes, in gold mining, would have the same effect upon the flushing mixture as clay, and it will be interesting to have figures from such mines where hydraulic packing is carried on as to the minimum percentage of water required when slimes are present in the mixture.

BOOK REVIEWS

General Economic Geology—A Textbook—By William Harvey Emmons, Ph. D. —First Edition—Published by McGraw-Hill Book Company, Inc., 370 Seventh Avenue, New York 1922. —price $4.00

The standard, thread-bare phrase "fills a long-felt want" can be applied without apology to Dr. Emmons' book. The author's treatment of his subject is clearer and more suggestive than that of any of his predecessors. Also it is more comprehensive. His introductory definition of economic geology is to be commended. It reads: "Economic geology is the application of geology to economic problems."

The chapters on coal and petroleum are, in effect, geological handbooks in themselves. The reviewer has read nothing more lucid than Dr. Emmons' concise summary of the geology of petroleum and oilshales. He touches upon the highly disputations subject of the origin of petroleum and natural gas with skill and judgment. His classification of mineral deposits is given greater value and interest by the lists of important minerals appended to the description of each class of deposit.

To the student possessing an elementary knowledge of geology, this new volume will prove an invaluable guide. This is really Dr. Emmons' purpose in writing the book. This, however, does not imply that it will not be of pronounced service to all classes of mining men.

It is the first approximately adequate text-book on economic geology. No doubt of its merits will remain after the reader shall have spent an hour or two in giving it a preliminary reconnaissance.

We recommend it without reservation to teachers, students, and practising engineers alike. The English-speaking technical world has waited only too long for just such a manual. The hastily compiled makeshifts that have heretofore been foisted upon us may now be thrown into the waste pile.

The Province of Quebec: Geographical and Social Studies, by J. C. Sutherland, B. A. Inspector-General of the Protestant Schools of the Province. —Renouf Publishing Co., Montreal.—Price $1.25 post paid.

The volume under review is, incidentally, an implicit rebuke to those that speak loosely about religious intolerance in the administration of the Province of Quebec. Mr Sutherland, in a concise summary of Quebec's educational system, demonstrates the fact that Protestants are very fairly treated. No doubt, religious bigotry exists in Quebec, as it certainly does in other Provinces that the reviewer knowns intimately. Yet it is not permitted to obtrude itself (a highly objectionable self in any guise) in matters educational.

It is worthy of note that four of the six illustrations embellishing Mr. Sutherland's text are connected with mineral industries. Probably the choice was made unconsciously. Whether this be the case or not, it is really significant.

A quotation will give our readers a colourable idea of the character of the book. "This book," says the author in his introduction, "can fairly claim to be a "pioneering work in one essential way, because it is the "first that has made any connected attempt to describe "a Canadian Province in accordanec with the scien-"tific principles of modern regional geography."

This excerpt, however, does not sufficiently indicate the ground covered by Mr. Sutherland. In nine chapters he carries the reader though this little-understood Province, giving him a creditably good, though necessarily sketchy, view of its geography, geology, government and culture—"culture" being applied to both its physical and sociological aspects.

"The Province of Quebec" needs none of the reviewer's overused adjectives to recommend it. Even if it were not worthy of praise **per se** (which it is), it would deserve attention as the production of a member of the Protestant minority in a Province where Catholics are in an overwhelming majority.

Reading a book for the purpose of reviewing it is seldom pleasant. The probabilities are always in favour of the reviewer getting mentally bilious, and then someone is bound to be treated badly. However, this review will conclude with the judicial asservation that Mr. Sutherland has turned out a book that is much above the average of semi-official publications, in that it is accurate and readable. To do full justice to his subject he would have to produce a series of tomes rivalling the **Encyclopedia Britannica** in word- content.

As a postscript it may be added that the author makes graceful acknowledgment to Messrs. Theo. C. Denis and J. A. Dresser for their advice as to the geological portions of his book. Mr. Sutherland could not have had more competent counsel.

The Economics of Petroleum, by Joseph E. Pogue, 375 pp., illustrated—published by John Wiley & Sons, Inc., New York.

The mining engineer is, so to speak, at sea when he has to deal with oil-bearing lands unless he makes a very special study of every phase of a very complicated branch of the mineral industry.

Those who witnessed the Calgary boom at close range know that oil experts were created overnight. Given a geological patter, a lack of conscience, and an opportunity, the tonsorial artist of yestesday became the oil specialist of today. All that was required was a favourable report on territory owned by ambitions vendors.

The other side of the shield is displayed in Mr. Pogue's admirable volume, which is a competent review of the economics and technology of petroleum. Organization, development, production, transportation, refining, marketing, utilization, and so on, are discussed lucidly. The volume is compendious. Textually and typographically it is a book to which both author and publishers can point with pardonable pride, and one, also, that the engineer and invested alike will do well to procure.

Notes From Nova Scotia

"Sabotage" Condemned by Miners

Mr. Hiram Donkin, Deputy Commissioner of Mines, N. S. and District Inspector S. B. McNeil, recently conducted an investigation into the spragging open of a door in No. 4 Mine, Glace Bay. A number of witnesses gave evidence, among them the mine official who had found the door open. The blame could not, however, be attached to any individual but the enquiry was not without effect. The workmen were represented by counsel, who stated that it was their anxious desire to have the culprit found and brought to justice.

The common opinion is that this act arose from the violent language of labor leaders and others who have been busy fermenting strife and sowing the seeds of discord and sedition among the colliery workers. Whatever the cause, it was a dastardly act which was fortunately discovered in time to save the lives of 300 miners from death by a mine explosion.

As it was the lives of these men were imperiled while the door was open, as it short-circuited the air currents, shut off the air supply and left the workmen to either die of suffocation or perish by more sudden disaster.

Safety Work — a Good Investment

The efforts of the Safety Department of the Dominion Coal Company on the human side of the coal industry have not been sufficiently advertised by the Company to attract the attention of the public and inform them of what has been accomplished by means of organization and education. This lack of publicity on the part of the Company may be entirely due to a realization of the fact that prevention of accidents is considered part of the day's work, which effects the efficiency of the business and has therefore been organized into a separate department.

While this is no doubt true, it should be borne in mind that publicity and education are large factors in the work of the Safety Department, and through these same means the general public should get to know what is being done in the way of prevention of accidents and of the aid rendered when these do occur.

Experience has taught that the majority of accidents are preventable; that they occur either through the carelessness of the workman himself or of some other fellow workman, or even of an official. Therefore it is necessary that the fundamental principles of caring for his own safety and that of others should be inculcated, and habits of carefulness and forethought be formed. Safety Supervisors see that workmen are instructed and that during working hours safety bulletins, safety posters and safety literature are ever before them, and their minds so filled with safety ideas that it is scarcely possible to forget that their own welfare is after all the first thing.

Safety and Insurance

A few facts and the principles of prevention of accidents having been imparted, these beget others, and so the training and the education of the workmen grows and spreads through all the works, and the industry becomes more noted for its low accident rate than for its great dangers. In this way the status of industries has been changed, and workmen who have been placed by Insurance Companies in the list of hazardous occupations have found themselves on an equality with men of the more favoured and less dangerous occupations.

The primary object of First Aid and Rescue work is to have sufficient specially trained men to take immediate charge of the situation, where life is imperiled through some serious accident, to give prompt and proper attention to injured men and to provide clean and aseptic dressings that will prevent infection in the wound.

When it is considered that infected cases require three times as long to recover as non-infected cases, there can be no doubt that the work of rescuing men is of the greatest value to the employer and employees alike.

The welfare, the comfort, the health and safety of the workingmen is being cared for by the Empire Steel Company. Much money has been expended in placing safeguards on machinery, in erecting new and up-to-date wash houses at the collieries in modernizing the old ones, in establishing first aid stations at convenient places on the works, and on insisting that workmen who live in Company houses, shall keep the premises clean.

Safety Organization

The Safety Department is well organized, and is under the control of a Central Committee composed of the Executive heads of the Steel and Coal Companies. These men have had large experiences and meet periodically to consider and review all phases of Accident Prevention, to discuss and determine on all safety devices, to study the causes of serious accidents and to make recommendations which will tend to prevent a recurrence of these in future. Being in constant communication with other employers of labour and in close touch with bureaus of information, they are in a position to procure valuable information on the latest and best methods of accident prevention. This knowledge is passed on by way of instructions to the Safety Engineer and Safety Inspector.

A Sub Committee composed of Colliery Superintendents receives and reviews all reports passing through the safety office and coming from colliery committees and make their recommendations to the Executive Committee. Each colliery official is member of the colliery committee which meets twice each month to discuss safety matters affecting the individual collieries.

The head of the Safety Department of the Steel Corporation is J. N. Morgan, Safety Engineer.

Alexander MacEachern is Chief Inspector of Mines. He is an experienced, capable and energetic official who fully realizes that the safety of the collieries is in his hands. Under him are a number of trained men whose duty it is to travel and inspect all workings and machinery of the collieries and make a daily report.

The Rescue Department is under the Chief Inspector of Mines who sees that weekly instruction in use of the Draeger or oxygen helmets is carried on by competent instructors. A visit to the Draeger House at No. 2 Colliery, New Aberdeen under the eye of A. MacMahon, a man most proficient in both practical first aid work, is a revelation to the uninitiated of

what is being done along the lines of rescue and first aid work. The Draeger house at No. 2 Colliery is one of the best equipped stations in Canada, and every thing necessary for rescue work at the Colliery is to be found there, even to the merry little singing canary, so susceptable to the influence of mine gas, but rarely used except when mine explosions occur.

Hector A. MacDonald is Surface Inspector, having charge of the collieries, the railways, the machine shops and the piers. Mr. MacDonald is a young man, who has entered upon his duties with an enthusiasm that is contagious. Since his advent upon this work, safeguards of many kinds have been placed on machinery over the entire plant.

The Accident Report for the year 1921, is in some respects very encouraging. The number of fatal accidents in 1920 in the Glace Bay District was fourteen. The number in 1921 was eight, a decrease of six, or forty-three per cent. The fatal accident rate has fallen steadily since 1917. If the Glace Bay District were cut off from other parts of Nova Scotia and a comparison made with other mining countries, it would stand in the fourth place, taking rank after Britain, Belgium and France. It is a good showing, and proves that much progress has been made. No fatal accident occurred to workmen on the surface during the last year.

The non-fatal accidents in 1921 show a decrease of 5.4 per cent. over 1920. This is not as satisfactory as might be expected considering the outlay on organization and machinery. Unfortunately the system of checking up and investigating all but the more serious of the non-fatal accidents is not and cannot be an effective one until such time as the Government takes steps to improve it by legislation. Fatal and non-fatal accidents of serious nature are, because of their very seriousness, reported at the First Aid Stations where they have been treated. Minor accidents, such as cuts and bruises, are ofttimes not reported until the person applies for compensation. Investigation of all such cases after that is a mere matter of form, which may or may not find the facts as they really are. The attention of the Compensation Board has been called to such cases, but they say "that it is a matter for the Government." Herein no doubt lies one of the greatest handicaps of the safety department in its efforts to ascertain and eliminate the cause of accidents. Until such time as all accidents are treated at the Safety Stations, much of the work of the Safety Department must remain unseen, and the statistics of accidents will fail to give the reliable information so much needed.

"Bumps" Overcome by New Method

During the last few years a number of miners were killed in No. 2 Colliery, Springhill, Nova Scotia, by "Bumps" of the working faces. Sometimes, however, these occurred on main roadways, throwing down a large amount of coal, and interfering with work generally. The depth of mine cover is 2,200 feet. The floor coal rock roof is hard and smooth. Such conditions were ideal for bumping under the methods of mining usually followed in that district. The suddenness with which these bumps occurred, with their ofttimes fatal results, created a dread in the minds of experienced miners who had been accustomed to note the warnings of impending danger. Here was a new enemy without warning, against which no one could guard and no precaution could be taken.

A new mining problem had arisen and the Coal Company attacked it with courage and understanding. The old method of mining was modified and made to meet the new conditions, and has so far been successful in preventing bumps.

The work of winning the coal was concentrated on smaller sections, and pushed forward rapidly until all the rooms and pillars coal was withdrawn. This allowed the roof to fall in, and thus relieved the pressure that would be otherwise thrown down on the other workings, thereby creating the very conditions that tend to cause bumps. The method usually followed was to open a double balance with eight or ten rooms on each side and drive all rooms forward at the same time. When the boundary of 300 feet was reached, the pillars were then drawn, care being taken to have the upper pillars in advance of the lower ones. This led to great roof pressure, to bumps, and sometimes to a considerable loss of coal.

Under the improved method, balances are driven to the rise as former, but only the three top rooms on each side are advanced, and that only to a distance of 150 feet. The pillars are then drawn, allowing the roof to fall in, which relieves the pressure and prevents bumps or other loss of coal.

A singular feature of this method is "that instead of very thick pillars being left to meet the conditions of deep mining, the pillar is only 24 ft. thick." The with of the room is 12 ft. This improvement in the method of mining has not only tended to make the work much safer for the miner, but has resulted in giving a large percentage of coal, leaving little behind.

Mr. W. Herd is the Mining Engineer of the Company. He has had a large experience in British mines and naturally feels jubilant over the results gained in the Springhill collieries.

Advertisements other than "Employment Wanted" or "Employees Wanted" will be inserted in this department at the rate of 20 cents per agate line (14 agate lines make one inch). $2.80 per inch, each insertion, payable in advance. Space measured from rule to rule. When four or more consecutive insertions of the same advertisement are ordered a discount of 25 per cent. will be allowed.

Advertisements of "Wanted Employment" or "Wanted Employees" will be inserted at the rate of two cents a word, net. Cash must accompany order. If box number is used, enclose ten cents extra for postage in forwarding replies. Minimum charge 50 cents.

FOR SALE.

Complete Mine equipment consisting of:—
2—60 H.P. Portable Boilers Complete,
1—Donkey Boiler with Hoist,
1—Hoist.
1—3 Drill Steam Compressor.
1—8 x 8 Belt Driven Compressor.
1—Electric Lighting Outfit complete.
1—10 Ton Capacity Holt Tractor.
1—Leyner Drill Sharpener.
1—10 x 16 Farrell Crusher with Screens.
Pumps, Drills, Stopers, Milling Equipment Etc.
Laboratory outfit with small crusher, glass ware, balances, etc
Above installed only short time and in good condition.

J. G. SIPPRELL, B.Sc., Engineering Equipment, Bedford Chambers, Halifax, N.S.

EDITORIAL

In a true democracy, we are all masters in respect to the interests of the community as a whole, and servants in respect to our special abilities. Our greatest mistake so far has been in considering industry as somehow outside of democracy.--C.V. Corless--1917.

NEON IN EVERY-DAY LIFE

IT has often been stated, and almost as often disbelieved, that pure science is at the bottom of most of our present-day material progress. It is, ordinarily, hard to conceive how the abstractions of physics and chemistry, astronomy and zoölogy, can be applied to every-day human affairs. We have seen recently a perfect demonstration of the seemingly impossible.

Who would believe that the rare gas, neon has a practical use in operating an automobile? It is inert, incombustible, difficult to isolate, and until lately has been regarded mainly as a scientific curiosity. For a decade or more it has been used experimentally as a source of light; but research has only lately made it undoubtedly useful.

The manufacturers of electric lamps are among the most progressive of all modern men of business, though they are among the latest arrivals in the industrial world. Each of the huge plants throughout this continent has a research department, where highly-trained physicists and chemists search out Natures secrets. At one of these plants, in Pittsburgh, a young physicist was examining the properties of neon. He was impressed with the readiness with which a glass tube containing the gas glows when brought near a wire connected to an induction coil.

In Pittsburgh everybody has an auto, and everybody is, likewise, bothered at times with ignition troubles. After the day's work comes a spin, and occasionally a stalled car. Our physicist naturally joined together the two parts of his day. Why not use a little tube of neon to indicate leaks and breaks in the ignition system? A trial in the laboratory showed that the idea was practicable. The idea survived passage through the development and manufacturing departments, and now the tubes are on the market, and the factory is turning them out the rate of four or five thousand a day.

There is an unending succession of such ideas, awaiting discovery by researchers. Some will lead to neat little devices, others will be epoch-making in their respective fields. Especially in metallurgy, the latest of man's major fields of industrial activity to become organized along modern scientific lines, lie opportunities for the researcher.

The handful of metallurgical researchers in Canada have had remarkable success. The production of electrolytic copper, lead and zinc at Trail and the successful treatment of complex ores; the separation of the conglomeration of useful elements in the ore of Cobalt; the solving of nickel problems, one after another; the economical treatment of rock containing three or four per cent. asbestos fibre—these attest a quality among our practical metallurgists that is worthy of emulation. But we must not forget that it is mastery of pure science that is, directly or indirectly, the foundation upon which all this progress is built.

INSTITUTE AND INDUSTRY

In the last two issues of "Engineering and Mining Journal Press," Mr. T. A. Rickard has presented a clear analysis and pungent criticism of "the functions of Institutes." Mr. Rickard's intimate and personal acquaintance with the various Institutes, British American and Canadian, gives him a vantage point from which he may view, judicially and impartially, the merits and de merits of each case. His conclusions are worth close attention, whether they can be accepted as they stand or not.

In discussing the policy of expansion recently adopted by the Canadian Institute of Mining and Metallurgy on the recommendation of their Secretary, Mr. Rickards concludes that "the result is a club, not a technical society. Mere expansion is worse than futile unless it is in the right direction. If the Canadian Institute will become as the American Institute has become, a model of organization of all those connected with the mining industry, in short, a Mining Congress.

This may all be true as regards matters of fact and possibilities for the future. We are glad to have Mr. Rickard's pronouncement of the elements the society holds in store for the Canadian Institute, but to

decline to accept the fate he predicts, as inevitable. There is an alternative.

The present policy of the Canadian Institute of Mining and Metallurgy is to enlist to co-operation and support of all those that have a legitimate interest in the mining industry of Canada. The Institute has a place among its members for the man that puts his money into the development of a mine alongside the engineer that spends it. Such intimate contact is necessary outside the Institute—why not in it? It is true that the introduction of financial and trade interests into the councils of the Institute bring in at the same time a tendency to disruption; but the mining industry is a unit, and in no other way than by means of such a common meeting place can the internally-diversified interests be brought together in an adequate way. Call it Mining Congress if you will; it is a necessity for a well-organized mining industry.

How is the solidarity (and possibly the professional exclusiveness) of the technical members of the Institute to be maintained? This is the question that in the main directs Mr. Rickard's criticism, as it should direct our constructive measures. Unless prompt and effective measures are taken, it is certain that the fate predicted for us will overtake us. We have at hand the means of avoiding the disruption of our technical body and the perversion of its high ideals.

Ideals are of restricted use until put into practice. The ideals of our Institute, as stated in its charter and re-iterated on occasion, are worthy of close and constant attention. But they have remained largely nebulous and useless because we have failed to bring them to earth. One of the Institute's principal concerns is, or should be, to keep its members in the strait and narrow path, and to ensure, so far as is humanly possible, that those in the industry, outside the institute, shall do likewise. In other words, the Institute, to put in practice its ideals, must scrutinize closely the conduct of its members, and must, outside its membership, act as "watch-dog" for the industry.

As pointed out in these columns some weeks ago, it it is entirely feasible to put into operation the simple measures that will ensure much action. We already have in our Institute a carefully selected professional membership, whose first duty, individually, is to see that the best traditions of our profession are maintained. Why not guard these traditions collectively? By so doing we shall create a bond of union among the mining and metallurgical engineers of Canada that will not only serve to maintain the present admirable qualities of the Institute, but will foster the growth of an essential quality that the Institute has heretofore lacked—the "esprit de corps" ("tribal spirit," if you will!) that can come only when men work together, seriously and consistently, in pursuit of a high ideal. Canada needs, and is awaiting anxiously, the good offices of such a body.

THE MINING INDUSTRY AND INSURANCE COMPANIES

That there should be a closer understanding between mine operators and insurance companies is easily demonstrable from present inequalities in premium rates. It is not our present intention to discuss specific instances. The broad statement may be made, however, and made without fear or contradiction, that the insurance companies are not awake to the opportunities the field of mining offers.

The past decade has witnessed sweeping changes and improvements in the management of metal mines and in the prevention of accidents. Some of these improvements have been brought about by legislation, but the most vital are to be attributed to the voluntary efforts of enlightened operators. The "safety engineer" is a more or less recent innovation. His function is not merely to see to it that prohibitions and inhibitions are respected; upon him devolves as well the duty of inculcating into employees the spirit of co-operation which is the only safe and sane foundation on which to build.

Without danger of being invidious, he may cite the Ontario Department of Mines as a notable example of efficient administration in respect of mine accident prevention. Fatalities in the metal mines and quarries of Ontario are lower for each thousand men employed than in most other mining regions. Investigation of accidents is prompt and searching, and full publicity is given in every instance. This is not altogether the case, we regret to say, with other Provinces.

In our opinion, insurance companies would do well to recognize in a very practical sense, the excellent and sustained efforts of governments, corporations and individuals in the direction of the conservation of human life. Such recognition would be in keeping with the spirit of the age and would without doubt bring its own reward to the companies themselves.

SUDBURY MINING DIVISION

The Sudbury district is known throughout the world as the source of the world's nickel. The story of the locating of the first deposit during the construction of the Canadian Pacific Railway; the accidental discovery of the nickel content of the ore; the struggle to separate nickel and copper and then to find a market for the nickel; the use of the metal by navies and armies, culminating in the Great War; all these form parts of an epic that is still in the writing. Nickel producers are "up against it" once more, and are tackling these new problems with the vigour and discrimination that has brought them through hard times before. They have large and well-developed mines, ore that is without rival, smelters that have paid for themselves already, and last but not least, an invincible determination to find a market for the metals they can produce.

Meantime the people of Sudbury are suffering. They have had all their eggs in one basket, and there has been a spill. Their dependence upon the nickel industry is now painfully obvious. But they, too, are taking hard times with a grin, and are looking round for new fields wherein to expend their energies profitably. They have not far to look.

Sudbury is the natural outlet of a promising mineral area, until recently dwarfed by the greatness of the nickel mines. The Canadian National Railway to the north traverses a promising stretch of rocky ground that has yet received little attention. Business men in Sudbury are now making some attempt to determine its possibilities and to turn its potential mines into revenue producers for their town. Meetings are being held to consider ways and means of aiding mining development. Truly, hard times are good for the expansion of the mining industry!

The Sudbury Board of Trade is now asking the Provincial government for revision of the Tax Act, aid for roads, and a railway through the mineral area lying between the Canadian National and the Ontario Government Railways. It is obvious that the nickel companies, now struggling under disabilities it will take all their energies to remove, should not be taxed at the rate imposed when their profits were undoubtedly large. Justice demands this, and justice will be done. The building of the proposed railway also merits the most careful consideration.

There are already along the line of proposed railway two mineral areas that would help materially to pay its cost. The extension of the Elk Lake branch of the Ontario Government Railway to Gowganda has been long deferred because it would benefit only one silver producer. If it were continued westward through the Shiningtree area to the Canadian National Railway, this disability would be removed, as it would then serve several mines, and would stimulate the development of numerous others.

It might be argued that a branch line of railway as suggested, built as part of the Ontario government's system, would tend to bring to the Canadian National line revenue that should accrue to the builders. This is undoubtedly so; but no such consideration would we are sure, unduly obscure the vision or sway the judgment of the men to whom Ontario has entrusted her provincial railway policy. Ontario's railway may be provincial in point of geography, but no restrictive or provincial outlook should direct the policy of its operation and extension. There is already valuable co-operation between the managements of National and Ontario railways, and this can logically be continued in the case in point.

In the past, Sudbury Mining Division has suffered from its very prosperity. The "bonanza" days of the nickel field are now over, or at least in abeyance. Sudburians are to be commended in their efforts to stimulate and aid the development of the other mineral resources of their district.

EDITORIAL NOTES

"Gold, Gold in Cariboo", is the title of a hectic story relished in our youth. There promises to be a repetition of the scenes of the sixties and seventies in the famous old placer camp of British Columbia. It is more than likely that here, as in other mineral-bearing regions of our Dominion, the pioneers merely skimmed over the ground; the areas are so vast that not much else was possible. We may logically hope for numerous "finds" from the stampede now in progress.

We have every day fresh evidence of the world-wide attention being drawn to Ontario's gold fields. Among the more recent arrivals in Canada is the South African company mentioned on another page. That capital from the gold-fields of South Africa should seek investment in the development of gold mines in Canada, suggests a possible shifting of the present centre of the world's gold production. The production of the Rand is diminishing; that of Ontario is correspondingly increasing.

PROSPECTORS' SPRING SONG

Come, pardner — come; the golden Spring is here,
The mountains send their call to you and me.
The mountain streams are running swift and clear;
The sunny slopes from snow will soon be free.

All winter, we've been longing to be there;
We felt our souls imprisoned in a town.
We longed to breathe the fragrant, piney air,
And smell the camp fire when the sun goes down.

We longed to watch the morning sun arise,
And tint the mountain-peaks with rosy red,
While underneath, the sleeping valley lies,
With cloudy billows curtaining its bed.

We longed to climb the mountain's rocky breast;
To hunt for ore, and watch all Nature play.
And, when the sun was sinking in the west,
Hike back to camp, to end a perfect day.

Come, pardner — come, I hear the wild birds sing,
Their joyful love-songs ring o'er hill and vale.
A wakened world is welcoming the Spring.
Let's load our horses, pard, and hit the trail.

Donald C. Sm[illegible]
Sou[illegible]

Ontario's Gold Deposits

THEIR CHARACTER, DISTRIBUTION AND PRODUCTIVENESS

The impatiently awaited report on Ontario's gold deposits by Mr. P. E. Hopkins of the Ontario Department of Mines, has at last passed through the printers' hands, and has been distributed. It is available on application to the Department in Toronto. Its sixty pages of text are packed full of information, and as a bibliography alone it will serve a useful purpose.

Mr. Hopkins is specially qualified to write a comprehensible report on the gold mines of Ontario. For more than a decade he has been actively and intimately associated with the development of the gold fields discovered during that period. To know how complete his interest, one needs only talk with any of the numerous prospectors to whom he has given advice and direction. He is, in fact, known to the bush-whacking fraternity in Ontario as the prospectors' friend—a term applied to his brother geologists in the Department as well.

MR. PERCY E. HOPKINS

A good prospector was spoiled when Mr. Hopkins became a geologist. His instinct for searching things out has led him to many an old mine and abandoned prospect, where he has dug out debris and twenty years' accumulation of leaves to examine the veins, much in the way he had "dug out" his original information about them from dusty tomes in the library. Thus Mr. Hopkins is more than usually well-qualified to write about the attempts to develop gold mines that preceded his experience as a geologist.

After a short summary of the history of gold mining in the Province, the geological occurrence of the precious metal is briefly discussed. This discussion is necessarily sketchy, both for lack of space and for lack of definite information and well-founded theory. Next follows a description of the gold-mining districts, in geographical rotation from east to west. Of the 48 pages of this section, 18 are devoted to the active and producing areas in and adjoining Temiskaming District.

It is a significant fact that this report devotes 60 per cent. of its available space to the gold areas at present inactive or abandoned. These parts usually receive unqualified condemnation and curt dismissal, whenever mentioned at all. This summary treatment is ordinarily based upon hearsay evidence of the most hazy sort. This is what Mr. Hopkins says about one of these much-maligned districts. "The gold boom of nortwestern Ontario reached its peak in 1897, resulting in many unwarranted stamp-mills being erected. Inefficient management and stock-jobbing operators caused the loss of much capital; nevertheless certain mines—the Sultana, Mikado and Regina—produced from about one-half to three-quarters of a million dollars each." If stories of eye-witnesses are true, "high-grading" in these mines was so prevalent that the official returns of production represent only a fraction of the gold actually taken from these mines.

"Hollinger" is now a household word, and connotes gold, just as "Rand" does. Its success and that of several lesser (though large) mines has been a genuine stimulus to gold mining in the Province. As usual, many parasites have found nourishment in the purses of heedless investigators and speculators: but the ill effects of this diminution of funds for legitimate development and mining has not "killed" the infant industry, as it had invariably done in former cases.

This report has been written for the non-miner, and will be particularly useful to the investor, resident or non-resident. The wide distribution of a publication of this sort will prove a good investment of the public funds administered by the Ontario Department of Mines.

NEW MAPS READY

The following maps are now printed and ready for distribution by the Ontario Department of Mines, Toronto. They have been published in advance of the reports they are to accompany, as a convenience to prospectors and others that wish to use them.

Gowganda Silver Area—Scale 1 mile=1 inch—to accompany report by A. G. Burrows, Vol. 30, 1921.

Schreiber - Duck Lake Area—Scale, 1 mile=1 inch—to accompany report by P. E. Hopkins, Vol. 30, 1921.

Black River Area, Dist. of Temiskaming—Scale 1 mile=1 inch—to accompany report by D. G. H. Wright, Vol. 30, 1921.

Prospectors of the Cariboo

By ROBERT DUNN,
Mines Department, Victoria, B. C.

PROSPECTORS of British Columbia are asking when and from where the next great placer gold find is to be announced. They argue that these events come in cycles and that the pendulum has about swung to where it was when stories of the hardships of the Chilcot Trail were in all mouths. The free, almost wild, life of the Cariboo and of the Yukon, with the reward that gold bearing ground offers to the lucky, creates an environment that gets into the blood, and once there can never be removed. Robert Service, the poet of the Northland, has given the best existing conception, in his immortal verses "Songs of a Sourdough" and "Songs of a Chechako", of the conditions and the atmosphere in which the Yukon miner lived. Never has the epoch of the rush of '98 and the years of stirring incident and adventures that followed been so forcefully depicted.

The spirit of the "sourdough" is not dead. It burns still in the old-timers and younger men, waiting only the word of a "strike" to be fanned into flame. There will be modest stampedes next Summer into Cedar Creek, Cariboo, and to the Taseko Lake (Whitewater) country and, while the excitement in these cases is not yet great, let there be important discoveries and in a few months there will be in these new fields communities, no doubt closely resembling, in their hustle and bustle, their raw newness, and the variety of their amusement offerings to the miner "off duty", the Barkerville and the Dawson of the early days.

The "sourdoughs'" bull-dog perseverance and optimism are well illustrated in a recently published account of the death of a pioneer of the Yukon. This man was in the "rush" of '98. He staked on the Eldorado before the stragglers arrived, but was disappointed. Trading his claim for that of another miner who took from it the gold that formed the foundation for the fortune of a millionaire now resident in Seattle Wn., he again failed to find the precious metal. Again on Hunker Creek he missed and in all his subsequent ventures the cards seemed to be stacked against him by that fickle jade, Fate. Only a few months ago this prospector, now an old man, wandered from Dawson into the wilderness, searching as ever for the placer camp that

The Picturesque Cariboo Road, above Yale, B. C. in 1868.

On the Road to the Cariboo in 1868.

would make him as rich as Croesus. He has not come back.

As I have said there are many men of this calibre in the West. Those who went through the Yukon stampede, while the years have reduced their numbers, are as indomitable as ever. That was made evident when volunteers were asked for service with the Canadian Military Forces in the Great War. Their ranks are thinner if we are considering only the genuine old "sourdough." If permitted to count comparatively recent acquisitions, however, the muster roll would be substantial; for the call of the frontier, of the silent places, and the lure of hidden treasure, is as potent to red-blooded men as it was half a century ago. Large numbers of stalwart young men are to be found in mining and other outdoor occupations in British Columbia. A new "rush" would find them first in line. They are listening to the prospector's prophecy of a new placer gold camp, impatiently waiting for the news that will set their footsteps in the right path.

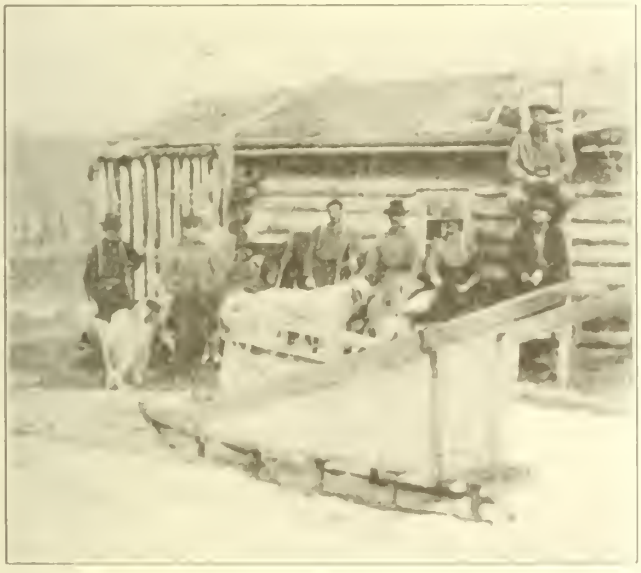
"Gold is where you find it" a prospector of the old school told me with impressive earnestness. He snorted with scorn when it was suggested that the geologist or the mining engineer might help. "We don't need no yellow-legged scientist," he exclaimed. "Them fellows never did do any good around an honest injun placer camp. They were not the first to put stakes in any of the big camps of the Pacific Coast and we don't want 'em. Put this in your pipe and smoke it; the prospector was on the job in Californee; he did the work and got out the stuff in Cariboo; and it was the prospector and a few Indians that started the Yukon stampede. And I don't mind tell'n you, kid, he'll do the trick again.

"Now this is my idee", the old fellow went on dreamily. "Leastwise it ain't my notion altogether, you'll understand. It was pretty generally thought in the old days that there was a 'gold run' from Alaska south. I suppose some of your engineer friends could give you a fancy story about that. You get the gold in Californee, in the flat country between the Cascades and Rockies of B. C., in the Omineca, the Yukon, and Alaska. Funny thing, trace it out on a map and you get a nicely balanced semi-circle. Kind of a quarter wheel with spokes pointing to discovered diggin's. But, young man, "—this in a portentous and mysteriously hushed

* Since this article was written excitement has developed in British Columbia over the Cedar Creek District of the Cariboo. Rich diggings were reported by prospectors in this locality late last season. Since then there have been reports from time to time of a favorable character. One of the last statements was that after removing four feet of snow and panning a little of the frozen surface ground several ounces of gold were obtained. Another prospector is said to have made good recoveries from an excavation started with a view to the building of a cabin. Already much of the district has been staked and is held either as leases or as ordinary placer claims. The Spring rush has commenced and there is no doubt that the disappearance of the snow will find hundreds of "Sourdoughs" and "Chechakos" on the ground.

voice— "there is a missing spoke. What does it mean?" and he leaned forward eagerly confidential. "It means that there is another, an undiscovered placer field, ground probably richer than all the others. It is in the Omineca, somewhere east of the Cassiar Mountains. I got it all figgered out. Goin to hit the trail soon's the days lengthen and maybe next winter you'll be wavin' your hand to My Royal Highness as I roll past in my limousine.

"Don't think me foolish, me lad. Take that 'gold rum' stuff. It's the real dope. Don't go much on these geologist 'bugs'; but ain't it strange how it's worked out from Nome to Californee? And then a miss. Then there's that 'Heighth of Land' south-east of the Yukon, supposed to have been thrown up before the Rockies. Anyway that's what those college minin' professors say and you got to give them credit for knowin' somethin', don't you? So me and my cronies got to thinkin' about it, and doin' some reading, too. No doubt about it, the glacial drift of centuries has been hammerin' against that high land somewhere near Thutage Lake, or the headwaters of the Finlay, or the Ingenika River. Remember it's a big country, there's been hardly any prospecting, and we may not find it in a season. But it's there and the world some day, even if we don't find the treasure, will say the old prospector knew what he was talkin' about."



Government Telegraph Station, between Atlin and Dease Lake

The wind droned and whistled outside the log cabin. One of the severe storms of mid winter in the North had the land in its grip. The Yukon heater, fed frequently on jack-pine, kept the small interior cosily comfortable. The old man 'bit up' again, shifted in his chair, ad resumed: "Don't suppose you know Monte Clair. Fine fellow. Regular woodsman prospector. Blew in last fall with some great samples and fine stories. He'd been over the divide, along the Finlay, and through the Gun-a-noot Country. That's where Gun-a-noot, the Indian who was hunted for murder for years, and finally gave himself up and was let off, spent his exile. No policeman could catch a good man in there, and he'd be roaming still if it weren't for his notion of selling the skins he'd cached to give his children a white man's education. But about Clair, his samples of copper and silver sure looked good. Said there was a ledge of copper he'd traced for miles. But it was his talk about the gold he'd panned that got me because, you see, it just jibed in with what me and my partner had been thinkin' and talkin' about. Course he wouldn't tell exactly where it is 'cept that it's somewhere in the 'Indian bad land'. That's the other side of the Cassiar Range and they've given it that name because the natives won't go near. It's kind o' neutral territory, a 'no man's land.' Footprints of giants were found there years ago, so the story goes, and the Indians believe it is haunted by fearsome creatures—'supermen' I suppose you'd call 'em. The boys of these days laugh, but don't like to go near all the same. So we've fixed up a party to go up the Kispiox and Skeena rivers and over to Thutage Lake this year. We're going to find something and if it's big, why, for friendship's sake, I'll stake a claim for you, son."

"Hope springs eternal" says one of the poets. What I've told of one prospector's theories and plans is actually true. Moreover, his is lucid reasoning, whether well founded or not, and may luck be with him! Many others might be quoted. There's that pioneer of pioneers, "Bill" Sherlock, of the Cariboo. Over eighty years, if he's a day, and as spry as a man of sixty; still living on his claims; spending the summer pottering around sampling and, in a small way, working his property and the winter in studying the Placer Act, which he knows backward, which is useful in keeping a watchful and critical eye on its administration. He'll tell you about fortunes lost and fortunes made in the early days of Cariboo; about "Cariboo Cameron" and his brother and their wins and losses; the "Lost Mine" of the Cariboo, fabulously rich legend says, and for which the old 'timers are searching to this day; Judge Begbie and his stern administration of British justice in a rough-and ready camp, and how he awed some troublesome miners who approached him during his evening stroll under spreading pine trees by explaining that he was picking out the best limbs for the hanging of those to be convicted on the morrow—all these yarns "Bill" will spin and more. If his history could be written it would make a book of more compelling interest than any novel. "Bill" is wedded to his Cariboo, but he, too, will whisper in moments of confidence that he can take you to a stream "where gold nugget's gleam on the river bottom like jewels in a royal diadem."

(To be continued.)

The Dominion Bureau of Statistics has made an excellent beginning in the prompt distribution of statistical information for public use. It has still a long way to go to make its service comprehensive, a good deal of time is necessary to effect the external and internal organization (particularly the former) upon which the prompt collection and compilation of information depends. The work is well begun and under the able direction of Messrs. Coats and Cook is sure to continue until we have a service worthy of the things and our country.

It is estimated that now that the strike is over the Rand production during April will be 90 per cent. and that for May about 100 per cent. of the normal output.

Brazil, like Central Canada, has no coal, but an abundance of water power. Unlike Canada, Brazil has plenty of high grade iron ore. This combination of natural resources has induced the construction of [illegible] blast furnaces for making pig iron with charcoal as reducing agent. One company has [illegible] already in operation, and two others are preparing plants.

The Shebandowan Nickel-Copper Deposits

A Unique Mineral Occurrence

By J. G. CROSS

There has recently been discovered near Shebandowan Lake, an interesting occurrence of nickel, copper, cobalt, and an unidentified mineral, carrying comparatively high values in the precious metals, particularly those of the platinum group. In this connection we are reminded of the Vermillion Mine, in the Sudbury District which is well known.

The Shebandowan ore is essentially pyrites, but carries subordinate amounts of pyrrhotite. Nickel, in the form of polydymite, and copper as chalcopyrite, occur abundantly in the ore. Cobalt is present in much lesser amounts, the ore averaging about 0.3 per cent. Nickel and copper occur in about equal amounts, although there are zones extraordinarily rich in each of these metals, with little admixture, (see analyses further on). The rare arsenides Skutterudite, and Gersdorffite, have been identified. Niccolite, and possibly other minerals occur also.

Location

This property is situated at the southwest end of Lower Shebandowan Lake, about 70 miles west of Port Arthur, Ontario. The property is about five miles from the Canadian National Railway; but as the lake lies between, it is better to go by way of Rossmere, a small station in the vicinity. From Rossmere a canoe trip of eleven miles takes you to the property.

There are eight claims located altogether, all along the strike of the ore body. Ore occures on five of these claims.

Geology

Keewatin rocks are exposed everywhere along the shore of the lake, except on part of the South side of the middle lake, and on the North side of the lower lake, where granite, probably of Algoman age, occurs.

The Keewatin in the vicinity of the nickel-copper deposit is a dark-green basic schist, dipping at a steep angle, the strike following approximately the contact with the granite. Dikes of serpentine, granite, and porphyry also follow the contact. The ore occurs in the vicinity of these dikes.

There is a large area of serpentine to the south about a mile. It is possible that the ore is in some way connected with this serpentine, as is the case at the Alexo Mine and elsewhere.

Nature and Extent of Ore-Body

The ore occurs as a series of lenses, more or less parallel, and connected by vein-like occurrences of ore. The lenses vary from two to twenty feet or more in width, and the length is proportional to the width. The ore as a whole is rocky, but in places is massive. The massive ore is rich, and carries from eight to twelve per cent. nickel. Massive chalcopyrite is of less common occurrence. Three feet of the ore carries 15 per cent copper in a pit near the lake shore. The average of the rocky material would be about six per cent nickel, copper, and cobalt, without hand sorting.

The nickel-bearing mineral is polydymite, no pentlandite having as yet been identified. In this respect also the ore differs from well-known occurrences elsewhere.

At pit ten near the lake shore, the ore has a width of about twenty feet, and is quite rocky; about four feet will probably prove to be fairly massive, but the gossan capping has not been penetrated, although a pit ten feet deep was sunk here. The lower portions of the outcrop contain bunches and veinlets of almost solid polydymite and chalcopyrite, occuring separately for the most part, but intermixed between these rich pockets. These rich pockets are sometimes soft and granular, and can be removed with a pick and shovel without blasting. The ore oxidizes rapidly on being exposed to the air, and soon falls to a whitish powder.

Cutting across the ore body at right angles approximately, is a series of veinlets carrying various arsenides. The following have been identified: Niccolite, Skutterudite, Gersdorffite, with possibly another whose composition has not been definitely established. The Gersdorffite is beautifully crystallized in places. Native copper occurs in considerable quantity in the partly weathered outcrop, and probably resulted from the reduction of the sulphate by organic matter.

At a considerable distance from the main ore-body there is a small vein of pyrrhotite about a foot wide. This is the only occurence of pyrrhotite on the property. It is rich in nickel, carrying about 7 per cent. This occurence is very similar to the ore from the old Vermillion mine, in the Sudbury District. Elsewhere the similarity is not so noticeable. No sperrylite could be panned from the gossan, however.

The rare metal content of the ore is especially noticeable. This is not surprising, as the ore is associated with much serpentine, and ultra-basic rocks. The precious metals, gold and silver occur only sparingly, however, —about $1.00 to the ton.

A sample was submitted to the Geological Survey for examination. They report as follows:

"The material from Shebandowan Lake submitted by you on Dec. 8th last, has received mineragraphic examination, an assay for platinum, and partial analysis.

"The platinum assay of sample 1 showed that the platinum group of metals were present at the rate of 0.16 oz. per ton. The same material on partial analysis was found to contain,

Iron	24.80%
Nickel	3.30%
Copper	5.50%
Sulphur	20.60%
Arsenic	.00%

"The microscopic examination of the polished surface shows that a complex association of fine-grained metallic minerals occur as a replacement deposit in chloritic schist. The minerals in order of their development are: Pyrites in scattered grains 1 mm. or more in diameter; massive pyrite, and finely chrystallized magnetite; chalcopyrite, pyrrhotite, and an undetermined grey mineral, with a rim of different composition from the kernel; polydymite.

"The nickel mineral is usually microscopic, and occurs in patches throughout the other ores."

Analyses

The following table shows the grade of the ore from some of the pits on the property. The width across which the samples were taken is given.

Sample.	Pit.	Width of ore, Inches.	Ni. %	Cu. %	Co. %
1	4	34	.99	3.43	.33
2	4	13	.29	.76	.17
3	4	24	1.97	3.30	.36
4	4	24	5.44	2.09	.25
5	4	25	1.85	1.91	.19
6	4	24	1.51	3.08	.25
7	4	24	1.01	.67	.34*
8	4	18	3.26	3.26	.25
9	5	27	3.80	2.22	.35
10	5	24	3.91	2.59	.38
11	5	24	1.50	1.35	.17
12	5	22	.62	1.46	.29*
13	3	Grab	8.09	.46	.42
14	10	Grab	4.13	2.47	.42
15	8	Grab	.58	16.60	.51
16 Selected			11.55	....	..
17 Selected			21.17	....	..
18 Pyrrhotite			7.13	....	.

* Rocky ore.

Two selected samples of the rich ore from pit No. 3 were taken by C. W. Knight of the Ontario Bureau of Mines and submitted to W. K. McNeill, Provincial Assayer, for analysis. The following results were obtained:

	No. 1	No. 2
	p.c.	p.c.
Copper	1.88	0.68
Nickel	10.54	6.73
Cobalt	0.44	....
Arsenic	.....	....
Sulphur	37.00	38.47
Platinum	.....	..
Iron	.....	31.58
Insoluble	.....	9.54

Economic Possibilities

The ore bodies occur for the most part in low land and are difficult to follow on this account. The work last summer consisted of trenching at various points to establish the size and continuity of the ore-body, and to collect samples for analyses.

Practically all the work was confined to the westerly outcropping, although a little stripping was done on the other extremity of the property, about a mile distant, on the shore of the lake. The result of the exploration work was highly satisfactory and much good ore was uncovered. The ore bodies were found to occur as a series of parallel lenses, and to be fairly continuous for a distance of over five hundred feet, with no diminution at either end. There was evidence of considerable faulting and dislocation.

A mile distant, near the other extremity of the property, the outcropping that resembled the Vermilion mine, spoken of before, was trenched. This outcropping was traced for several hundred feet westward, where it disappeared under a swamp. To the eastward the ore was sharply cut off by a fault, to appear again, however, about a thousand feet along the strike at the water's edge.

In this distance of over a mile, three outcroppings of ore have been explored only very superficially. The ore was of excellent quality, and a considerable quantity was of the "bonanza" variety. It is highly probable that in the low ground between these outcroppings future exploration will disclose a large tonnage of commercial ore. This is further suggested by finding boulders of ore along the strike on the low ground, not differing materially in physical character from any ore so far discovered. Furthermore where this low land comes to the water's edge much gossan, mixed with a few boulders of ore, are to be found under about a foot of water.

Considerable exploration work will have to be carried on, however, before the commercial possibilities of this deposit can be established. While there will probably be no large ore-bodies discovered, as ore goes in the Sudbury District, nevertheless the aggregate of these lenses of ore (if the ore proves to be only fairly continuous over such a length) will be a large tonnage.

The mining costs will be higher than at Sudbury, but this is more than compensated for by the pyritic nature of the ore, which will permit of pyritic smelting, and by the various by-products (cobalt, the precious and rare metals).

The pyritic nature of the ore should permit of pyritic smelting, and thus save a considerable fuel expense. The recovery of the cobalt adds an additional problem. However, as most of the cobalt is slagged off in the bessemerizing process, it might be possible by this means to separate the cobalt from the nickel and copper and afterwards recover the cobalt.

In the early days of the Sudbury camp some cobalt was recovered. The practice was not continued, however, so it is inferred that it was not profitable. The Shebandowan ores contain a much higher percentage of this metal than the Sudbury ores. But it remains to be proven if it will be a profitable undertaking to recover this cobalt or not.

Probably the best way to treat an ore of this kind would be to smelt to a low-grade matte containing the cobalt, precious and rare metals. This should be a comparatively simple and inexpensive operation, as little fuel would be required. The low grade matte could be further treated at one of the nickel refineries or smelters for further concentration and recovery of the various metals contained.

There is an abundance of developed water power within a reasonable distance of the property, so that the power problem would not be serious. In fact some form of electrical treatment might be worked out for this type of ore.

This property might have a very interesting future, when the nickel industry recovers from the slump.

PERSONALS

Mr. W. E. S[illegible] of the Dominion Explosives Co., Toronto, is expected from London next week. He sails April 28th.

Dr. W. G. Miller and Mr. J. B. Tyrrell are in London, England.

Prof. J. C. M[illegible] is to give an address on the Metric System in Toronto on April 28th. It is proposed to form a Metric Association in Canada.

Mr. M. W. S[illegible] of Toronto is on a trip to Mexico.

Mr. L. T. C[illegible] of Cooper Chemical Co., Toronto, is in the West.

Mr. Percy Hopkins leaves for Lake Gowganda on a week's cruise to [illegible] geological outcrops of the area.

The Southern Rhodesian gold output for February 1922 amounted to 51,422 ounces of [illegible] 511 ounces for January 1922 and [illegible] February 1921.

British Columbia's Mines In 1921

By Robert Dunn

Official figures just available through the issuance of the 1921 Annual Report of the Minister of Mines place the value of the mineral production of the Province for last year at $28,066,641. This is $7,176,443 less than the 1920 returns, or a decrease of about 21.06 per cent.

While there has been a decline, these statistics are considered most satisfactory. They show that British Columbia's mining industry, under adverse conditions the effect of which have been manifested the world over, held its own better than did the same industry in most of those of the United States that are engaged in mining. The drop in the mining returns of the State of Arizona for 1921 as compared to 1920 was approximately 77 per cent; of Montana, 75 per cent; Utah, 55 per cent; Nevada, 50 per cent; New Mexico, 77 per cent; Oregon, 43 per cent; Washington, 70 per cent. Hon. Wm. Sloan, the Minister of Mines, consequently feels that his report not only is gratifying in the story it tells, but is full of promise of what may be expected when world economic conditions become more nearly normal.

A comparative table, showing quantities and value of the mineral production for 1920 and 1921 follows:—

	1920		1921	
	Quantity	Value	Quantity	Value
Gold Placer, oz...	11,080	221,600	11,660	233,200
Gold Lode, oz ...	120,048	2,481,392	135,663	2,804,154
Silver, oz	3,377,849	3,235,980	2,673,389	1,591,201
Copper, pounds..	44,887,676	7,832,899	39,036,993	4,879,624
Lead, pounds....	39,331,218	2,816,115	11,402,288	1,689,354
Zinc, pounds ..	47,208,268	3,077,979	49,419,372	1,952,066
Coal, T (2,240)..	2,595,125	12,975,625	2,483,995	12,419,975
Coke, T (2,240)..	67,792	474,544	59,434	416,038
Miscellaneous products..		2,426,950	.....	2,077,030
		$35,543,084		$28,066,641

Metal Prices

Comment is made upon the marked drop in metal prices in 1921. As this has an illuminating bearing on what the mining industry accomplished in the past year, it is of special interest. In this connection charts are published showing that silver started in January of last year at 65.95c per ounce; that it dropped to 56.02c per ounce in March and from that low level climbed to 70.97c per ounce in October and then began a gradual decline until it reached 65.76c per ounce in the month of December. Copper was not as violent in its fluctuations, being quoted at 12.59c per pound in January and showing a disposition to strengthen towards the close of the year, being quoted as 13.03c per pound in November. Zinc and lead too are shown to have maintained a fairly even price of somewhere about .04 per pound up to a little over .05. If these prices are compared with those obtained in 1920, it will be found that on an average, miners then received nearly 50 per cent more than for a similar quantity of metals in 1921. Mining companies, therefore, deserve great credit for the manner in which the output has been sustained. Of course it is to be remembered that throughout the year, and particularly towards its close, the costs of mining, including wages and supplies, materially decreased.

Referring to the copper market situation, the report explains that last year all the large copper producers of the continent reduced their output to about 25 per cent. of normal, or shut down entirely, so as to reduce the stocks of copper on hand, but that now some of these companies are beginning to start up again, and that the outlook is promising. Whether the metal will go beyond $0.14 a pound for some time, however, is a moot question. While lead and zinc were not in great demand, the accumulated stock of these metals at the Trail Smelter has now been reduced, a market for the same having been found in the Orient. Thus many Slocan mines that were compelled to cease operations are expected soon to be working on a normal basis, as the smelter company again is able to make prompt cash payments for ores of these metals.

Production of Northern Mines

It is noted that the Northern Coast district produced nearly 70 per cent of the tonnage of ore mined in British Columbia last year, carrying about 55 per cent of the total value of the metalliferous output. For an explanation of this it is only necessary to turn to the statistics relating to the gold and silver production of the Premier Mining Company, Portland Canal District, and to the copper production of the Granby Consolidated Mining and Smelting Company at Anyox. On the point of copper, it may be said that while the production of 1921 was nearly 6,000,000 pounds less than in the previous year, the figures would have been different if the Britannia Mill, Howe Sound, had not been burnt down late in the fall of 1920. This property ordinarily can be counted on for from 15,000,000 to 20,000,000 pounds of copper. If this, or only a portion of this, had been available, the copper output for the year would have shown an increase.

The Collieries

British Columbia's coal industry has just about been holding its own. In 1921 the collieries of the Province made a net production of 2,483,995 tons (2,240 lbs.), as against 2,595,125 tons in 1920, a decrease of 111,130 tons, or about 4.3 per cent. With the exception of the year 1920, the net coal output for 1921 is larger than that of any other year since 1912, or of any previous year excepting 1910. The Coast District Collieries produced no coke last year, but the Anyox smelter plant converted coal into coke for the use of that industry. The Crow's Nest District produced 59,434 long tons of coke, of which about two-thirds was used in Canada and one-third exported to the United States. The aggregate of the values of British Columbia colliery products in 1921 was $12,836,013.00, this very nearly equalling the gross value of the year's metalliferous products, $13,153,598.00.

Gold

There was a slight increase in the placer gold output, amounting to $11,600 or about 5.2 per cent. The total aggregate value of the same was $233,200. Practically all this came from the Cariboo and Cassiar Districts. The steady decline in placer gold production during the past four years is attributed chiefly to such economic conditions as high prices, both for labour and supplies. A shortage of labour is also given as a contributing factor.

The value of the lode gold produced in 1921, was $2,804,154.00, as compared with $2,481,392.00 in 1920, an increase of $322,762.00, or about 13 per cent. The Boundary-Yale District made no production, the Granby Company having closed down its mines and smelter there. Nor was any production made by the Nickel Plate mine, which was closed down in the month of September. The Rossland mines, too, failed to reach

the production for which they were responsible prior to 1917, but showed somewhat of an improvement over 1920. With these facts in mind, it would seem rather curious that the lode gold production for the year should show a gain. Investigation however, indicates that the output of the Cassiar District, in which is situated the famous Premier Mine, is largely responsible. No less than 85,185 ounces are credited to this section. The Surf Inlet mine also made material contributions.

On the question of gold production, the report observes that during each of the last four years, British Columbia's output has only been about one-half of what it was annually immediately preceding the war, and shows "that gold mining in this Province, as elsewhere in the world, has been adversely affected by the condition of high cost and a standard price for the metal. Nevertheless from the development now in progress, it would seem then in a short time the annual production of gold in British Columbia should increase considerably".

Silver

With reference to silver production, it is stated that the greatest increase was made in the Skeena District, and is accounted for by new shippers, the chief of which were the Premier and Alice Arm Mines. The most marked decline was in the Slocan District, where mining was retarded because of the reduced market value of silver and its associated metals. There was a considerable output, however, in the Boundary-Yale District, despite the cutting off of the production of the Granby and the Canada Copper Corporation, which formerly produced 50 per cent of the silver of the district. The silver output of this district last year was chiefly derived from the Providence, Horn Silver, Sally and Bell Mines.

Copper

Under the head of "Copper" is published a table that strikingly illustrates 1921 conditions. The Cassier District produced 34,841,767 lbs. and the total for the Providence was 39,036,993 lbs. This brings home the splendid achivement of the Granby Consolidated. The Coast District output was about a million and a half pounds, a negligible showing as compared with the usual sixteen and seventeen million pounds. The Trail Division, however, gave a little better returns than for some years, 2,277,392 lbs. as against 1,113,085 lbs. for 1920.

Lead and Zinc

Tables dealing specifically with the Lead and Zinc productions also noteworthy. It is worthy of comment, for instance, that all but about three million of a total of nearly forty one and a half million pounds of lead came from the Fort Steele Division. This means, of course, the Sullivan Mine of the Consolidated Company, Trail. There has been a gradual decline throughout 1919 and 1920 of the quantity of this metal derived from ores having their sources outside the Fort Steele section. In 1919, twelve odd million pounds of lead came from Slocan ores, in 1920 it fell to six odd million pounds, and in 1921 the total runs to a little over a million and a half pounds. Conditions as to Zinc are similar, but considerably more so. It may be said that all the 1921 production of this metal came from the Sullivan Mine, so small is the quantity that came from others ores. Fort Steel's output was 49,319,198 lbs. and that from all other sources 100,171 lbs.

Other Minerals

Dealing with other minerals the Report states that there has been no metallic iron produced in British Columbia, "but it has been strongly advocated in many quarters that the conditions are favorable for the establishment of an iron smelting plant somewhere on the British Columbia coast. So far nothing definite has materialized although there is apparently a prospect of such a plant being established. As is well-known, there is on the Coast, in the aggregate, an adequate supply of magnetite iron ore, quite sufficiently free from impurities as to be within the 'Bessemer limit' to supply ore for such a plant."

The wide occurrence of platinum in connection with placer gold deposits gives reasonable hope that it may be found in payable quantities and justifies further investigation. Last year official reports show only $100 worth produced in the Similkameen District.

For the rest the Report is made up of detailed accounts of the activities of the years in the several Mineral Survey Districts by the Mining Engineers of those Districts, together with statements by the Gold Commissioners, Mining Recorders and the report of the Chief Inspector of Mines. The former are admirable descriptions of the properties they visited in 1921 and furnish the usual valuable source of information to those interested in mining. While recognizing the depression through which the industry has been passing, these engineers all look to the future with confident optimism. The reports of the Chief Inspector of Mines and the members of his staff deal with Coal Mining and, generally speaking, are very satisfactory. One important point the former official makes is that "the ratio of accidents per 1,000 persons employed in and around coal mines during the year was 1.45, compared with 2.67 in 1920; 2.103 in 1919; 5.159 in 1918; and 8.51 in 1917."

BUREAU OF STATISTICS ISSUES COAL BULLETIN

The first number of a new monthly series of bulletin on coal statistics for Canada has just been issued by the Dominion Bureau of Statistics. The report, prepared in the Mining, Metallurgical and Chemical Branch of the Bureau, shows in detail the output of coal from Canadian mines by kinds and by districts, exports of Canadian coal by ports of exit, imports of coal from the United States by kinds and by ports of entry. Comparative figures are given for preceding years.

The report shows that the net quantity of coal made available for consumption in Canada during January, 1922, comprising all coal imported, or mined in Canada, but excepting the tonnage of Canadian coal exported during the month, amounted to 1,919,000 short tons or 613,000 tons less than the corresponding figure for December.

The output of coal from Canadian mines during January, 1922 declined to 1,208,000 short tons or 130,000 tons less than in December, 1921. Of the 14 coal mining districts for which output data are given, 3 show a gain in production, 22 of these being in Alberta, and 21 reported a lower output than in December. Alberta was the only province in which more coal was mined than in the preceding month. The [illegible] in production by provinces in January, as compared with December was as follows: Nova Scotia, [illegible] tons, British Columbia, 6,000 tons; Saskatchewan, 13,000 tons; New Brunswick, 8,000 tons.

As stated above the report is the first of a series of Monthly Reports on Coal Statistics for Canada, copies of which will be mailed regularly to those interested. Applications for this report should be made to the Dominion Bureau of Statistics, [illegible].

News of Mining

The announcement is made of a payment of a quarterly dividend of $500,000 by the Premier Gold Mining Co., Salmon River, B. C. The company's capital is $5,000,000. A previous dividend of $400,000 was paid on Dec. 31, 1921. The Premier mine was turned down in 1915 by engineers representing Mr. W. B. Thompson of New York. It is now partly controlled by the Guggenheims. One lot of ore 286 tons, yielded $96,000. Of this yield 60 per cent. was silver and 40 per cent. was gold.

Bolivia supplies much of the world's bismuth. The Bolivian ores, containing native bismuth and the sulphide, are associated with tin or with silver and copper.

Carbon black production from the combustion of natural gas has assumed important dimensions in the Southern United States. The value of the output for the year 1921 was $5,350,000. Louisiana contributes more than half the output. In that state it is being made imperative for the operators to extract all gasoline before the gas is burned.

The Norwegian Government, on March 8, appointed a Committee to investigate the financing of the British America Nickel Corporation and that Corporation's relations with the Kristianssand Nikkel Raffinerings Verk.

Exports of ore from New Caledonia, the French penal colony, amounted during 1921 to 29,458 tons of chrome ore, 3,364 tons of nickel ore, and 3,273 tons of manganese ore.

As compared with wages current in the year 1913, German coal miners are now receiving from 1000 per cent. to 1500 per cent. more.

The oil-shale deposits of the Ermelo district, Natal, are estimated to contain 93,000,000 tons of shale yielding from 18 to 28 gallons of oil per ton. The development of these deposits is being projected at present.

Japanese Import duties on copper plates, sheets, ingots, etc., have been increased by from 60 per cent. to 170 per cent. by recent enactment.

In the proposed McCumber import tariff, all cyanide imported into the United States will be dutiable at 10 per cent.ad valorem.

The California State Mining Bureau reports that oil drilling experience has proved the economy of using diamond drills to a depth of one thousand feet. Beyond that depth difficulty of manipulation increases costs to a point that does not compare favourably with percussion-drill operation.

British Columbian coal operators are urging the imposition of an import duty on foreign fuel oil. It is claimed that an adequate duty would not only serve to retain $12,000,000 annually in the Province, but also add $5,000,000 to industrial payrolls. Fuel oil imports in British Columbia now amount to about 350,000 barrels monthly.

The Province of Alberta, in negotiations with the Dominion Government for control of her mineral and other natural resources, has expressed willingness to give up the annual cash subsidy now paid into Alberta's Treasury from Ottawa. An early settlement of the question seems probable.

In an address before the Toronto Branch of the Canadian Institute of Mining and Metallurgy, Mr. R. Home Smith emphasized the fact that capital for mining is drawn from every country in the world. He spoke warmly of the honest effort put into Canadian mining and deprecated the "sniffing" spirit of Canadian financial men. His advice to Canadian business men was that they visit and re-visit the North and do what they can to establish connection there.

The French Government has appointed a Commission to devise or recommend methods and schemes for the carbonization of lignites in France and her colonies. Deposits of lignite, peat, and bituminous shales are to be intensively surveyed. Particular attention is being paid to the utilization of peat bogs.

In Nottinghamshire, England, last month in the course of an inquest into the death of a coal miner, due to a fall of roof, one of the expert witnesses stated that the fatalities from this cause would in future be reduced. By a new device, used with the auger and chain, timber can be withdrawn in such a way as to obviate the use of the hammer and without weakening the timber.

Despatches announce that the German Government will presently issue aluminium coins to replace the paper mark. All except the one-mark coin will have an internal layer of copper.

A special report by Mr. A. J. M. Sharpe, submitted to the American Zinc Institute, well summarizes the present condition of the Zinc industry. Mr. Sharpe stated that new arrangements entered into between the British Board of Trade and representatives of British Smelters, whereby large tonnages of Australian Zinc were made available at a contract price, had given the smelters the cheapest obtainable supply of concentrates. As in Broken Hill concentrates the silver and lead contents are of commercial value, it is deemed essential that the zinc retort residues be washed at tabling plants. The installation of such plants, in Mr. Sharpe's opinion, will tide several of the British smelters over periods of low prices. The reserve stock of zinc in Belgium is now down to normal. Belgium still must pay for many thousands of tons of Australian concentrates contracted for at high prices. The situation is governed by the fact that the cost of producing a ton of zinc is to day £22 in Germany as compared with £26 in Belgium, France, and Britain. French smelters are producing just enough for domestic consumption. The same is true of Germany, and practically true of Norway and Sweden. The unsold stock of zinc in the United States is the primary reason for the London price being £1 to £2 lower than it would otherwise be. European stocks are disappearing much faster than those in the United States which amount to nearly 60 per cent. of the world's unsold accumulation.

News and Comments

by Alexander Gray

Germany's Merry-go-Round "Money"

The German money factories are outstripping all outputting records; even script manufacturers will have to look to their laurels. Of what earthly use is it for mining share producers to try to compete with a government that can run off 7,767,000,000 marks in six working days? The printers strike in Canada has a lot to answer for.

Smelter's Financing

It is proposed to issue $6,000,000 of 7 per cent. twenty-year bonds to refund certain Consolidated Mining & Smelting obligations and in exchange for the other bonded indebtedness of the company. This, with accumulating funds, will provide a more liquid position to extend the present concentrating plant at Trail, erect a new mill at the Sullivan Mine, and generally equip the latter with more efficient operating facilities. When a concentrator is built at the Sullivan, the freight charge on ore now shipped to Trail will be largely eliminated, and the concentrator at Trail can be used for the generality of Rossland ores. Apart from these announcements made at the annual meeting, the promise to return to dividend distributions during the latter half of this year, bespeaks further optimism on the part of the administration. The expectation is the bond issue will be disposed of at parity. Zinc and lead prices are better now and should do better still; consequently the Consolidated is heading for speed limits.

Nickeled Tinplate

Rustless tinplate to be made so by means of a nickel bath, is aimed at by a Swansea Steel-Nickel Syndicate in which Henry Mond, son of Sir Alfred Mond, is interested. The added cost should be insignificant, and that should commend the invention briefly referred to in cables. It is the comparative cheapness of tinplate that made its market. Packing and canning people always were sensitive about tinplate tariffs that might influence the first cost and popularity of products in universal use. If nickel tinplate is as represented, producers of nickel in the forms required will welcome another outlet, to speed sales that have been moving too slowly to be comfortable.

The Mitchelson Promotion

Private advices to the effect that Sir. Arthur Mitchelson, Ltd., were left with 80 per cent. of their Porcupine issue, rather indicates, if reports be true, that London is not so easily inveighled. Worse things could have happened to the British public, and to Canada. When members of the issuing firm came all the way from the world's metropolis to Porcupine, and seriously announced "it was not convenient to go below the 300 ft. level of the mine", which evidently had not been dewatered for their inspection, laxity was feared and it was thought another discredit mark was being framed for Canada. However, according to cables, 20 per cent. of the share-offering was taken by the public and that is something to be thankful for. If it was so soon to be done for, what was it begun for?

The Deadly Parallel

"A report on Ontario's gold deposits, written by the Percy E. Hopkins, and published by the provincial Department of Mines became available to the public today. The first copies are being rushed to the province's agent-general in England to meet the many inquiries in that country regarding the gold mining in Ontario. With the unsatisfactory conditions of mining in South Africa and the spectacular rise in Hollinger among the great gold mines of the world, British speculators are inquiring into possibilities in the province and both the daily and the technical papers in the Old Country have laid considerable emphasis on this swing of Ontario's mines into public favor."

"Negotiations which are likely to prove favorable for Hattie Gold Mines are to be commenced on Monday, when directors of the company will meet Mr Wilson, the representative of two English financial houses, who has come to Toronto with an offer to purchase a block of treasury stock of the company.

"Mr. Wilson represents the British Security Trust Company and Stanley P. Dunlevy and Company, of London, England, who have had an examination of the Hattie Mines made for them, and have received a favorable report. It is understood that he will undertake to buy 500,000 shares of treasury stocks at 25 cents a share."

How much of a treasury will Hattie have? The Security Trust, as a title, sounds better than twenty-five cents' worth of Hattie.

Tonopah Belmont Canadian Profit.

As one of the American mining companies consistently endeavoring to develop Canadian mineral areas, Tonopah Belmont has more than the interest of goodwill. From the Mandy Mine in Manitoba, the Tonopah people realized profit out of keeping with their strenuous efforts. Then they took over Surf Inlet properties, which they developed and equipped, at a cost that would have deterred the less experienced. Now, it appears, Surf Inlet had a set back last year, as these figures show:

	1921.	1920.
"Other Income", including Surf Inlet dividends	$56,119	$201,532

In reality, Surf Inlet showed an operating profit of only $62,759 in 1921, compared with $195,259 in 1920. Of that, $62,500 went toward dividends to the parent Tonopah as against $250,000 in 1920. The grade of ore, it is explained, fell from $10.62 to 6.89. As the ore reserves, including those of the Pugsley mines are placed at 175,173 tons (values not stated), it is hoped the mining position will improve or that the company will find something better.

Yukon Gold Keno Hill Results

The first authoritative statement concerning Keno Hill, Yukon Territory, results are those of the Yukon Gold Company. During the winter of 1921-22 Keno Hill operations yielded 2,110 tons of ore containing [illegible] ozs. silver and 62 per cent. lead to the [illegible] gross value. Up to December 31, 1921 [illegible]

1,347 tons ad been mined, and a total of 3,000 tons was hoped for from the 1921-22 winter's work. As shipments are expected to begin in dune, when the break-up occurs on the Yukon River, it should soon be possible to have further evidence of what the two seasons brought to the Yukon Gold Company.

Power Problems Partly Solved

Award of Three Carrying Places power rights on the Abitibi River to Hollinger Consolidated Gold Mines, is a welcome developement. It is a step toward the solution of the vexing power problem. The understanding is the privilege granted to Hollinger will be promptly availed of. Although further removed than the power originally applied for by the Company, the locality, it is said, lends itself to more economical development. Hollinger has the money to go ahead; but what is to become of the numerous other enterprises awaiting cheap and efficient power? Admittedly the Northern Power people cannot do it all. If Northern Ontario is to become the center of Canadian gold production, the power situation will require broader treatment.

Imperial Oil to a Finish

Authoritative announcement is made that the Imperial Oil Company will prosecute explorations for oil in the west and north-west until failure or fruition is assured. In this, the Imperial is consistent with what it declared to be a sense of National Duty. It is incredible that the Prairie Provinces and Northwest Territory do not contain oil. The mission of the greatest Canadian producing and refining organization is to find it. More of this sort of reproductive capital is what Canada needs.

Nighthawk Lake Peninsular Mines

Because of its prolonged probationary period and repeated reverses (for which the properties were not to blame), Nigthhawk Lake Peinsular Mines are the most interesting undergoing development, under the management of A. R. Globe, and the direction of Messrs Thaw, Dodworthy, Callinan and others, mostly of Pittsburg. Private funds (and no fuss) have acquired over 1,800 acres and presented an underground and surface situation that proves the unwisdom of precipitate judgment before thorough testing. An ore-body of width and excellent grade, another awaiting development, and a large section from which much is expected even though the average value be low, have prompted the influentieal directors to provide more plant. They prefer to define their mines before seeking public support. If progress this summer is up to schedule, these Nigthawk properties may establish a new gold area.

Relief From Nickel Taxation

When mistakes are made and they are realized, it is the part of wisdom to correct the errors, and sin no more. That is why it would be a display of better judgment (second thoughts being best) if the petition of Sudburians for a reduction on nickel production were granted. Special taxation is deliberately prejudicial, at all times. The nickel industry was singled out for surtaxes, just when it needed official help. "What is sauce for the goose, is sauce for the gander" being an aphorism applicable in the premises, all taxation should be equably apportioned. Premier Drury has promised to give the matter prompt consideration in order to encourage those who are rehabilitating the nickel industry. Consequently, there may soon be a more contented Sudbury, and its pre-requisite, a larger payroll. The burden of the complaint is—

> Whereas gold and silver mines pay a tax of only 3 per cent. on profits between $1,000,000 and$5,000,000, nickel mines pay 5 per cent., but the even greater difference is that the tax in the case of silver and gold is on basis of the value of the ore at the pit mouth, and therefore applies only to the profits of actual mining operations, while with nickel the profits taxed not only include the profits in mining, put in roasting, smelting, refining and selling as well."

Asbestos Industry Complications

The annual meeting of the Asbestos Corporation enabled President W. G. Ross, at all times a prudent business man, to point out the perplexities attending the Asbestos Industry. So accustomed are we to hear that the Quebec deposits are supreme, unparalleled in their excellence and great quantity, it is more than admonitory to have Mr. Ross declaim against any embargo upon crude products. Limited domestic markets, international exchange, competition from South Africa and possibly Russia (not overlooking the United States), according to Mr. Ross make inadvisable any legislation that would invite reprisals that might prove disastrous. While there are those who will not altogether concur in the conclusions of Mr. Ross (it is desirable that we export more of the finished articles) it seems as though the whole situation should be carefully gone into before there are heroic departures that might prove foolhardly. Undoubtedly Washington is not showing much consideration for outside industries or foreigners. But Mr. Ross invites attention when he says:

"To the ordinary reader of articles that have appeared lately advocating an embargo, it appears to them that the province's raw material should be manufactured here, but the facts of the case are, that if any such foolish policy were adopted it would sound the death knell of the asbestos mining industry of the province, for the reasons that, if such a policy were adopted, the world's supply of raw asbestos would come from Rhodesia, Russia and the United States itself, and Canada would mine only sufficient to supply such small proportion for her own needs that no mine could operate profitably. At present, approximately 1 per cent. of what is mined would supply the Canadian consumption, nor could she sell, if she did manufacture, practically anything outside of her own territory.

"No matter how well dressed up it may appear to the public generally, and how well it may appeal to those ignorant of economic conditions, it is sufficient to say that if the manufacturing concerns of Great Britain, Germany, Belgium and France, who have the finest manufacturing plants in the world, are unable, with a large and favorable rate of exchange in their favor, to sell in the United States, how hopeless it would be to expect that Canada could sell any manufactured goods outside her own territory, the demand for which is insignificant."

Canadian Iron Ore For Germany

Contracts with three German steel companies for Wabana iron ore signalize the resumption of an export trade that is expected to assume large proportions. Germany is short of iron ores, and the British Empire Steel Corporation is in a position to make prompt deliveries. It is reported between 400,000 and 500,000 tons are to be shipped. This, and the re-starting of the nail plant, provide a morsel of cheer for Sydney officials and workers.

Northern Ontario Letter

THE GOLD MINES

Hollinger

The month of April found the Hollinger Consolidated with a record of over $44,000,000 in gold produced, thereby exceeding for the first time the aggregate value produced up to this time from the Nipissing Mines at Cobalt. The Nipissing was first operated in 1903-4 and was not long in taking the lead as the greatest producer of precious metal among companies operating in Canada. The indications are that the Hollinger, which commenced to operate in 1910, will now move far ahead of any other company in point of aggregate precious metal produced in Canada.

Dome

After allowing for all costs and expenditure during the year, the Dome Mines realized $1, 250,000 profit on the twelve months period of operation ended March 31st. After making liberal allwance for depreciation and exhaustion, a profit of $633, 309.22 was shown.

Recent information shows that diamond drilling operations have indicated additional bodies of high-grade ore. Assays are stated to run all the way from a few dollars to upwards of a thousand dollars per ton, all of which holds out good promise of the continued operation of the mill on ore which carries an average of about $10 in gold per ton. In the meantime, a very large tonnage of medium grade and low grade ore is being placed in sight and assures a long life for the Dome.

Preston-East Dome

Arrangements have been made to operate the property of the Preston-East Dome. Details of the arrangement are not available at the time of writing, but it is understood the necessary details have been arranged. Wm. Gowans, who was some years ago engaged at the Dome Mines as mine captain, will be in charge of the work. The property lies directly south of and adjoins the Dome Mines.

Porcupine-Davidson

Apart from the operation of one diamond drill, no work of any consequence is being done on the Porcupine-Davidson Gold Mines. This is the name of the company that succeeds the Davidson Consolidated and in which an effort is being made to arrange finances in England.

Porcupine V. N. T.

Considerable attention is centering on the Porcupine V. N. T. and the prospects of another paying mine being established at Porcupine. The former records are being looked into. Among other things these show that over $800,000 was produced. This came largely from the Vipond claims which are now known to contain lower grade ore than that occurring on the North Thompson. The Vipond and the North Thompson having been consolidated into the Porcupine V. N. T., it is now the intention of the management to concentrate effort on the North Thompson side, where high grade ore has been found to occur. The outlook for the enterprise is exceptionally bright.

Hollinger Gets Power Rights

The Hollinger Consolidated has been given the right to develop a water power on the Abitibi River, following a number of conferences with representatives of the T. and N. O. Railway and the Abitibi Power and Paper Company. The site set apart for the Hollinger is known as Three Carrying Places portage and will allow for the development of about 40,000 h.p. if required. The control of the flow of water from the storage basin on Lake Abitibi will probably be under the direction of the Ontario Government. In the meantime, litigation between the Hollinger and the Northern Canada Power Company is unsettled.

Porcupine Crown

Some crosscutting is being done on the Porcupine Crown, along the north boundary. No other work is being contemplated on this property until the difficulties with the Thompson-Krist faction can be straightened out.

Lake Shore

In the regular monthly report of the Lake Shore Mine, manager R. C. Coffey points out that the mill ran 95¾ per cent. of the possible running time and handled 2,210 tons of ore during March.

The mill handled an average of over 71 tons of ore daily and the ore yielded an average of approximately $24.83 per ton. A continuation of this record would show an annual production of about $657,000 a year from the Lake Shore.

Montreal-Ontario

The merged properties of the Ontario Kirkland and the Montreal Kirkland are to be known as the Montreal Ontario Gold Mines. The company has $5,000,000 authorized capital, made up of 5,000,000 shares of the par value of $1 each. Officials are confident of being able to place the enterprise on a paying basis before the year is out.

Lebel

A local syndicate is negotiating for property in the Lebel township part of the Kirkland Lake district. Identified with the syndicate are H. C. McCloskey, D. Angus and the Tough brothers. The Fetterly-Tobico-Perry claims have already been secured, while negotiations are under way for a group formerly known as the Pindle as well as for the Moffat Hall. The latter lies adjacent to the Bidgood in which the Tough brothers are interested and which is being managed by D. Angus.

Good Results at Depth

Within the next sixty days the Teck Hughes will have established an operating level at a depth of 980 feet, while the Wright Hargreaves will have its main shaft down to the 700 ft. level, with operations under way at the 200, 400, 550 and 700 ft. levels. Also the work of carrying the shaft of the Kirkland Lake Mining Company to 1,150 or 1,200 feet will be well under way. Also the Sylvanite will be operating at a depth of 800 feet, with lateral work well advanced at that depth. These details tend to show the general progress in the scope of mining work from one end of the Kirkland Lake camp to the other. A feature is that in each case where work has been carried to depth the extent of the ore has increased.

Tashota

A deal is being negotiated for the Nelson Hog River property, situated in the Tashota section of the Kowkash mining area. There are known to be low grade ore deposits on the property, and plans are being made to explore the deposits at depth by means of diamond drills.

Elstone-Dunkin

According to present indications the Elstone Dunkin property in Gauthier township may be tied up until about September. The company was involved in certain negotiations through the late Henry Cecil, and certain options hold good until September unless some other arrangement may be made before that time with the executors of the estate.

Teck-Hughes

While cutting a working station at the 7th level of the Teck-Hughes mine, high-grade ore has been encountered, according to advice just obtained. The information came as a surprise for the reason that it had generally been believed some cross-cutting would be necessary to reach the vein and that some drifting would be necessary before reaching the downward continuation of the rich ore-shoot found at the 600 ft. level.

The present reports about a rich strike at the 7th level which lies at a depth of 730 feet was referred today to D. L. Forbes, general manager of the Teck Hughes, but Mr. Forbes declared he had nothing to say. It is obvious that any statement at this time would be premature, as the importance of the development may be determined only by a reasonable amount of lateral work. However, should the discovery prove up with further work, it will tend to justify the recent optimism with regard to this enterprise. These developments will serve to change the destiny of the Teck-Hughes, in addition to being important to the Kirkland Lake field as a whole.

Shiningtree District

In an interview with M. P. McDonald, managing-director of the Atlas Gold Mines, it was learned that diamond-drilling operations are going ahead at a rapid rate on this property. The first hole has been completed to a depth of 200 feet and passed through what is known as the Evelyn vein, the core showing a width of 18 feet of vein matter, of which a five-foot section on the foot-wall was almost solid sulphides. The second hole is being driven to a depth of 400 feet and is already down about 200 feet. Mr. McDonald brought out samples of the core with him and these will be assayed at once.

Activity in the West Shiningtree gold area is increasing and the result of work is highly encouraging.

In addition to the diamond drill work announced on the Atlas, it has been learned that a number of other properties will be explored in this manner.

The question of sinking another 200 feet on the White Rock property is now being considered, and the company is stated to have funds for the work. Recent developments on this property proved the occurrence of some spectacular ore.

George Rogers of the Ribble Mines, operating the Wasapika, left a few days ago for the property, taking a crew of men along with him, and is preparing to carry out a carefully considered program of work.

Negotiations have been entered into with regard to letting contracts for diamond drilling on the Miller-Adair property, and this is expected to be ordered in the near future.

It is also reported locally that the owner of the Westree property are considering a diamond-drilling program.

Holtyrex

Two diamond drilling machines have been taken in for the purpose of exploring the Holtyrex property at depth. Attention will be directed toward exploring that area lying in a contract zone which passes over the property in a north-easterly direction. Harry Holland is in charge of operations while Smith and Travers have the diamond drilling contract.

THE SILVER MINES

Nipissing

The statement made by R. B. Watson, general manager of the Nipissing Mines, that the option on the Rochester property at Timmins would be dropped, came earlier than had generally been expected. Mr. Watson is quoted as saying that they had put down nine diamond-drill holes, some of which were as deep as 1,000 feet and while they did find gold values, the directors decided that the results were not sufficient to warrant them in believing that they had a mine in the Rochester, so they have cancelled the option.

The Nipissing Mines will probably produce close to three million dollars worth of silver during the current year and will realize close to one million dollars net profit, according to the information presented at the annual meeting by general manager Watson.

In spite of only a medium price for silver, the net profits during each of the first three months of 1922 averaged approximately $75,000, or at the rate of about $900,000 a year. As to this, the price of silver has recently been advancing and the indications appear to be that net profits will gradually increase.

Diamod drilling commenced about two weeks ago on the Gordon property in Northern Manitoba, on which the Nipissing holds an option. It is too soon to estimate the possibilities of this venture.

Concerning the company's oil leases in Kansas, the revenue is sufficient to pay expenses and may leave a small amount as profit. Nothing will be done on the company's iron property near New York until such time as costs come down and a suitable method of concentration may be decided upon.

A large number of shareholders attended the meeting, the old board of directors being unanimously re-elected.

McKinley-Darragh

Work has been resumed on the McKinley-Darragh mine, and about 75 men are to be employed. There are approximately 25,000 tons of broken ore in the mine, as well as other resources, and it is believed the enterprise may now show a fair margain of profit. The Sibleys who formerly controlled the McKinley-Darragh have reduced their interests in the mine, and this appears to have passed largely to T. R. Finucane. The new board of directors consists of the following: J. R. Starr, president; T. W. Finucane, vice-president; T. R. Finucane, treasurer; J. H. Spence, secretary, and with H. C. McCloskey and B. E. Finucane, directors.

Bailey

Work has been suspended temporarily on the Bailey mine, the reasons being financial. It is expected the work may be resumed within the next two months or so.

Gowganda

The Ontario Government is being urged to complete the work on the Gowganda road this year. The highway from Wig-wam lake to Gowganda, a distance of about seven miles, is the only part unfinished and the completion of this would provide a good motor road right from the railhead to the mines.

Nothing will be done this summer on the Collins property at Leroy Lake.

Silver Prices

March 31st.	Highest price	66.125
March 2nd.	Lowest price	63.000
	Average price	64.440

Notes From Nova Scotia

In Union Lies Strength.

The fusing of the Dominion and Scotia Coal Companies into the Empire Steel Company has had good results and has led to greater economy in both the coal and iron-ore industries. Boundary leases had been a prolific source of trouble between the two companies and had caused large expenditures of capital to operate duplicate systems, especially in the Wabana ore mines. At Sydney Mines two of the largest collieries had also been affected, and were much crippled in output. All efforts of the Labor Unions and citizens through the most influential bodies of the Province had failed and the coal lease question remained unsolved. Public opinion is slow to mature, but gradually the public mind began to perceive that there was only one solution to the question, and that lay in the two companies getting together. Mining experts had seen this years before, and had been quietly working towards such a union. When the news of the proposed Empire Steel Corporation was made known, it broke upon the ears of the employees and of the mining public with more of gladness than of regret. Only one of the leaders of the United Mine Workers has taken strong exception to the new Company, and he finds in it a means of forming a labor party. Whatever the outside public may think of the subsidiary companies and of the Empire Steel Corporation, the mining communities see in it the salvation of the iron-ore and the coal trades.

Men of large experience and clear vision, who in after years will be acknowledged by their countrymen as great Canadians, saw clearly that all industrial prosperity rests on low-cost production of the two basic commodities, coal and steel, succeeded in realizing their dreams and will see their efforts crowned with success.

With improvement in trade conditions the Empire Steel Corporation will stand as a bulwark of strength in the economic and industrial life of Canada.

Progress Due to Union.

The union of the two companies completed, the Company set about to get a thorough knowledge of all coal seams. These were prospected by means of a diamond drill and a large amount of new data was obtained. While this coal field has a large quantity of coal of excellent quality, the supply is far from being unlimited as is commonly stated.

The iron-ore measures were better known and little prospecting was necessary.

In the meantime the general conditions of the Collieries were surveyed, the regularity of the strata at the greatest vertical depths noted, together with all changes of dip in the measures. When it had been proved, as far as engineering skill can prove an undersea mineral field, that all indications pointed to vast supplies of coal extending many miles under the bed of the ocean, policies were laid down and plans mapped out for extracting the greatest possible amount of coal from the greatest possible distance.

Four mining problems immediately stood out which in land areas would not have had to be considered. These were: 1 ventilation, 2 motive power, 3 transportation underground, 4 crush of the superincumbent strata.

The Cape Breton collieries have a long way to go if indeed they will ever reach a depth at which the coal will crush and make it a constant factor of difficulty in winning coal. The dips of the seams are easy and none of the present working seams lie at any great depths.

Transportation of coal underground on main ways can be done almost as cheaply as overground, provided the main haulage-ways are well kept up. The problem confronting the Company is the underground transportation of workmen to and from the working faces. Men cannot be lowered into and drawn from a deep mine by way of long slopes without consuming much time. This shortens the working day at the face and it can easily be understood what an hour in transit each way means when an eight hour day is in force. Recently the miners of Nova Scotia applied for an eight hour day from bank to bank. If this is granted the most a miner in the deeper collieries will be able to do is five and a half hours work.

To revolutionize the motive power is the least of the large questions of the Empire Steel Corporation, although a large expenditure will be necessary. Electric power will in future be largely used in the collieries both for haulage and running purposes.

The Eight-hour Day.

The Eight-hour from Bank to Bank Bill, has been given a three month's hoist in the Halifax Legislature. This Bill was modelled after that of British Columbia, without any regard to the conditions of Nova Scotia collieries. Had the Bill passed, it would have proved a boomerang to the Labor Party that introduced it. But the members of this Party are shortsighted and at best can only see in one direction. They reason that if the miners in British Columbia have an eight hour day from bank to bank, the miners of Nova Scotia should have the same. They know that at the present time, more than an hour is consumed by miners travelling over the exceedingly long roadway, they know that these distances in the larger collieries cannot be reduced, but that they are growing longer with every working day. They know, or ought to know that eighty per cent. of the Cape Breton coal output, which is by far the largest producing centre in Nova Scotia, is taken from the undersea seams and that those must be followed to their inner most recesses by means of the best equipment known to mining. This means a large expenditure of capital. But if after this is done there is to be only a day of from five to six hours at the working face, then the Labour Party of Nova Scotia will have proved beyond doubt that they have succeeded in destroying the coal industry at a time when constructive effort was needed to forward it.

In the year 1919 the British Government appointed Mr. Sanky to investigate and to recommend remedial measures for the British miners who committed to a shorter day than eight hours. Mr. Sanky recommended a large increase in wages and a seven hour day. The Government was displeased with the seven hour day but granted both it and the wage increase. Then two disastrous strikes to prove to the British public that war wages could not be maintained. Now that wages have receeded to a low level a shifting movement is afoot to get back to an eight hour day, with the benefit of an additional hour's wages. It cannot be attained. But a worse factor than wages [illegible]

British Mining Industry in the large number of men now employed. In 1917, the British coal output was approximately 291,000,000 tons, the total number of men employed being 1,021,340. In 1920, the output had fallen to 263,000,000 tons with 1,248,224 men employed or an increase for a much reduced tonnage of 226,884 men.

The argument used by Labour Leaders in the past, that a colliery equipped with up-to-date machinery can hoist as much coal in eight, as it did in ten hours under the old system, may have a grain of truth in it, but it has been clearly demonstrated that the same amount of work cannot be done in seven as in eight or ten hours. The eight-hour day in all normal mining, seems to be the limit where production remains constant. Less than this brings low wages, loss of output, a languishing industry and a discontented mining class. To us in Nova Scotia it would mean a demand for increased wages at a time when the wage question has reached a most acute stage.

We have not considered here the competition of coal from the United States, coming from districts where a nine-hour day is the rule. The miners of Nova Scotia have an eight-hour day, with which they should be well satisfied.

Advertisements other than "Employment Wanted" or "Employees Wanted" will be inserted in this department at the rate of 20 cents per agate line (14 agate lines make one inch) $2.80 per inch, each insertion, payable in advance. Space measured from rule to rule. When four or more consecutive insertions of the same advertisement are ordered a discount of 25 per cent. will be allowed.

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EDITORIAL

Of all ways whereby great wealth is acquired by good and honest means, none is more advantageous than mining; for although from fields that are well tilled (not to mention other things) we derive rich yields, yet we obtain richer products from mines; in fact, one mine is often much more beneficial to us than many fields. — Georgius Agricola — 1550 (From Hoover's Translation).

BRITONS FOR BRITISH DOMINIONS

The movement now on foot in Britain for "migration within the Empire" deserves the most serious attention of the various Dominions and Colonies. The problem is receiving the attention in the old land of a number of those master minds that have guided the destinies of the British Empire for two centuries. It is a vast problem, of vital importance to both Britain and the Dominions, and requires all the thought and energy that can be brought to bear upon it.

The facts are, briefly, these. Britain's population, trebled during the period of the industrial revolution of the last century, has now reached a maximum. Britain can no longer hope to increase her industry within the British Isles; in fact signs are not lacking that there will be a gradual recession in her ability to manufacture imported raw materials and sell them at a profit. Thus the natural increase of her population must find a means of livelihood elsewhere. The immediate necessity for emigration is unusually pressing, due to its stoppoge during the war years and the present industrial depression.

It is most desirable that this outflow of British people from the old land should be to British lands beyond the seas. Of all the Dominoins, Canada has room at present for the largest total number of settlers; and it is British settlers we need and want most.

Most of us have an unshakeable belief in the sterling qualities of the Britisher. He may strike; he may irritate us Canadians in a dozen different ways; but we believe in him, for we are of the same blood, if not, indeed, kith and kin. The Britisher is, essentially, the most adaptable of civilized men. It is this quality that has won for him the waste places of the earth. The present problem is to transfer the surplus of industrial workers in Britain to the vacant lands of Canada in such a way as to inflict a minimum of hardship upon the migratory thousands and to give them the best chances for success in the new land.

To those well-versed in the history of British migration we can well leave the formulating of a scheme adequate for the occasion, and sufficiently well-founded to endure for the coming century. Our Canadian government authorities will aid the settlement of the new-comers by every means in their power, and will have the co-operation of numerous private organizations and of a host of private individuals. What can we miners do as our but?

As pointed out recently in these columns, one of the most effective, as well as the most rapid means of producing wealth from Nature's store, is mining. Activity in mining promotes a corresponding activity and growth in agriculture, commerce, and industry. This increased activity in all branches of practical human endeavour is the surest means of attracting settlers and ensuring their successful absorption into our national economic structure.

If Canada is to do the best within her means to assist in the migration of British people and their retention within British dominions, we must rapidly find and develop the mineral resources that we are confident will soon make Canada the Empire's chief source of mineral products.

PIGS AND PROSPECTS

There is a certain difference between a mining prospect and a pedigreed bull calf that is not generally recognized. Likewise, there is a similarity between a mining prospect and a "pig in a poke" that is known only to the initiate. This difference and this similarity are worth some study.

When a farmer pays five thousand dollars for a bull calf, he does it on the basis of a pedigree, which he has examined carefully and finds to suit his purpose. This pedigree, back of a healthy young animal that is worth only a few dollars as beef, warrants his investment. The calf may die and leave him sorrowing, but he must take a chance on that.

The "pig in a poke" is the antithesis of sound investment. The porker is not as good a risk as a square throw of the dice or a poker game, because in his case the dice are loaded and the cards are stacked. If the pig is sound and worth the price, there will be no need of concealment.

Every day in the week and every week in the year the public are being asked to pay their good money to see a "pig in a poke", which has been dressed up to look like a bull calf of honourable lineage, just at present in this country as well as abroad certain mining [illegible] the centre of the stage with [illegible]. Behind the scenes are some promoters who [illegible] are about as sound as those of the animal [illegible]. With them there is sometimes, [illegible]

an engineer who is a party to the gross deception, though seldom does an engineer allow himself to associate with these theatrical gentry. Sometimes the "show" turns out to be a comedy, and then it is a failure so far as the actors and stage managers are concerned. Often it is a tragedy, and then it is customary for the chief actors to feel their bulging pockets, smile on one another, and prepare for another good run. In any case, the "star" of the show is slaughtered, and ceases to interest either public or performers.

A prospect is essentially a "pig in a poke," with the difference that it is so very young that, in spite of all appearances, it may possibly turn out to be a big healthy animal. A mine is different altogether; it has developed ore-reserves, and the means of guaranteeing a return on any reasonable amount of money spent for a mill or for further development.

To be more explicit, though somewhat axiomatic: the development of a prospect is built upon hope, as was the effort of the prospector who discovered it. **Predictions** are always speculative, and usually unwarranted. **Hopes** are necessary, and if well regulated, are useful.

Under present-day conditions, to trade upon the hopes of the engineer, and thus to raise the hopes of the investor, is the business of the promoter. If done within reason, this is legitimate; if reason is exceeded, as so often is done by unscrupulous promoters and brokers, the chances are that the whole scheme will prove a boomerang to the mining industry, missing (unfortunately) the promoter and broker on the way back.

Promoters and brokers are just as necessary for the development of our mining industry as are engineers. All three must work together if the maximum benefit is to accrue to the industry. Money must be raised to keep the engineer at work. But reputable engineers and brokers (who are the large majority) should join forces in a determined effort to purge their ranks of those parasites whose object it is to bleed the public's financial resources without any thought of a fair return.

CANADIAN CERAMICS SPECIALISTS FOR CANADA

On May 12th, there is to be held in Toronto a meeting of those interested in ceramics, for the purpose of discussing the proposed establishment of a special course in ceramics in Toronto University. The movement has originated with the officers of the Canadian Clay Products Association.

Canada's ceramics industry is at present in an embryonic state. The simplest clay products, brick and tile of various sorts, are manufactured at strategic points through the Dominion. One small firm manufactures floor tiles, and our manufacturers of enamelled-ware make a finished product. This, roughly, gauges our ceramics industry at present. We have no potteries, and we import our ever-increasing supplies of porcelain.

Our present dependence upon imported pottery and porcelain is not due to a lack of raw materials. Feldspar that has set a standard for this continent, if not for the world, is available in abundance, and is exported in large and growing quantities to the potteries of the United States. Clean silica rock is available at numerous places. China clay in deposits of large but undetermined extent have been located sixty miles from Montreal, and are now being developed commercially.

What we lack now for the establishment of an indigenous ceramics industry that will adequately provide for the needs of our country is the informed human effort that will put to use within our borders Nature's gifts of raw material. At present our young men who wish to become proficient ceramics engineers must go abroad for both their technical training and their practical experience. It is high time we tackled our own problem for ourselves, instead of relying upon our neighbors.

The field for the manufactured products of clay, silica and feldspar appear promising at present. Brick is gradually and surely replacing less substantial materials for dwellings. Intensive cultivation of the soil and improvement in methods of farming call for an increasing amount of drain tiles. The walls and floors of large buildings are composed, more and more, of hollow tiles within a framework of steel. Electrical development involves the use of a huge number of porcelain insulators.

The movement to train Canadian ceramics engineers in Canada is timely. We need a native ceramics industry of much larger dimensions than at present. The surest way to get it is to train young Canadians to do the work. When the Dominion's forests needed expert attention in the worst way, a forestry course was founded, and it constituted a centre from which emanated information and propaganda that have gone a long way toward solving the problem. The same is possible with ceramics.

The Journal hopes that this latest step towards the goal of Canadian industrial development will be made at the earliest possible moment.

IRON AND STEEL IN INDIA AND THE EMPIRE

India bids fair to outstrip soon in her production of iron and steel, all the British Dominions, and to become an important factor in world production. This has long been predicted by students of the world's resources of iron-ore and coal. It remained for a Bombay banker, Sir Jamshedpur Tata, with the co-operation of an American technical staff, to begin to fulfil this prediction.

In 1912 the first of a series of modern blast-furnaces was put in operation at Jamshedpur in the province of Bengal, as well as a complete steel works. During the war time this works supplied all the Eastern theatres of war with the railroad iron upon which military opera-

tions essentially depended. The timely enterprise of the Bombay banker may be said to have saved the East for Britain. Since 1912 the plant has been increased to include three blast-furnaces, and two more are in course of erection. A second company, the Bengal Iron Company, are also producing iron and ferro-manganese, and a third, the Indian Iron and Steel Company, is expected to begin production this year.

How do the British Dominions stand in comparison with India as iron producers? Canada at present leads; but unless radical changes are made in her methods of production, such as will take further advantage of her natural resources, she cannot long maintain the lead. The Nova Scotian industry has an abundance of ore and of coal; but the ore is rather low-grade and highly siliceous, and the coal is in submarine strata, and so cannot be won so cheaply as the coal of some competitors in the iron and steel trade. The iron production of Central Canada is dependent for its existence upon imported ore and coal, and upon a protective tariff, and so cannot be considered seriously in world affairs.

South Africa, like India, has been considered a potential factor in the world's markets for iron and steel. Here, though, the development is still embryonic. There are good coking coal and good iron ore, both in abundance, as well as native labour. But the country offers only a very limited home market and is not yet well-developed by railway facilities, and a large export trade is not yet feasible. Nevertheless the pioneer furnace has been built, and we can logically hope that the Newcastle Iron and Steel Company will have a long and prosperous career.

Australia, like India and South Africa, is well provided with both coal and iron ore, in reasonably close proximity. In this case both are close to the coast, so the iron and steel plant at Newcastle, New South Wales, has the additional advantage of being located at a seaport. The plant is notable as representing the reinvestment of earnings by the Broken Hill Proprietary company at their silver-lead-zinc mines in the interior. Unfortunately, perverse human nature has brought about a temporary (we hope) cessation of the operation of the plant. The wages of labour in Queensland are so high, and the productiveness of labour is so small, that even under the highly favourable natural conditions that exist at Newcastle and under protection of a high tariff, native iron and steel cannot compete with imported materials.

New Zealand is not so fortunate in her mineral resources for iron making as is her big neighbor. Her main resource of iron ore is the long beach sands of titaniferous iron sand at Taranaki. A number of attempts have been made to smelt this ore commercially, but none of them have been successful.

Meantime Britain holds her own in the production of iron and steel. Her iron ores are neither so low-grade nor so cheaply won as formerly, but scientific research is adding constantly to the material available. Her coal-seams, with [illegible] now used for the [illegible] amount as the [illegible] protected British [illegible] blown to [illegible] the [illegible] war years [illegible] [illegible] [illegible]

The Feldspar Situation*

By R. F. SEGSWORTH

Some weeks ago Mr. Ladoo's paper on conditions in the feldspar industry came to hand, and impressed one both by the soundness of the theories set out and by the fact that the findings given as to conditions in the industry corresponded closely with the results of our own more recent investigations. Recently Mr. Wainford's reply (1) thereto has been received and left the above impressions unaltered.

At the outset, we may leave to Mr. Ladoo for reply the criticism of the general scope of his enquiry, the form of his report, the question of whether or not his suggestions have been only destructive and not constructive and the possibility of submitting further evidence in support of his assertions. Suffice it to say in passing that the improvements suggested do not appear to be in use by Mr. Wainford's company, and that thirty-five or more years experience is no answer to the criticism of antiquated methods. In fact, the tone of reply rather suggests that a little retrospection has shown the criticisms to be rather applicable. Mines and mills are like human beings: they either improve or degenerate, and a policy of "laissez faire" in methods is useless.

The discussion naturally falls under two heads:

A. Mills and consumers.

B. Mines and producers.

A. With the first of these, we in Canada are but little concerned, owing to the almost entire absence of any grinding mills. At present there is in operation only one small mill. In view of the immense quantities and high grade of feldspar still to be mined in Ontario, the question of establishing mills in Ontario should be of interest to American grinders and consumers. The following figures show the production of crude feldspar in Canada, and in reading these it should be remembered that the Richardson mine at Verona, Ont., one of the largest producers of high grade feldspar on the American continent, has been shut down for the past four years, but is being re-opened within the next three months.

FELDSPAR SOLD (tons)

1911	1912	1913	1914	1915	1916	1917
17724	13733	15935	18060	15455	19488	19462
		1918	1919	1920		
		18782	15944	32000		

Up to the present, Canada has exported practically all its crude feldspar to the United States and imported from there nearly all its annual consumption of ground feldspar. At least 95 per cent. of the production of Canadian feldspar has come from the County of Frontenac in Ontario and the County of Ottawa in Quebec and 90 per cent. of the total Canadian production has come from the Verona district in the County of Frontenac near Kingston, Ontario. Recently deposits in the Buckingham district in the County of Ottawa have been opened which indicate the presence of a considerable quantity of feldspar of good quality. In 1900 the Verona district produced 4,000 tons; in 1920 it produced 32,000 tons. With improved transportation facilities, and the consequent re-opening of the largest quarry in the district, the next year should see this production practically doubled—a field well worthy of the consideration of the American grinders and consumers.

B. Mines and Producers. The conclusion to which Mr. Ladoo comes in this connection is that the great need of the industry at present is a continuous production of high grade feldspar of a uniform quality. To this Mr. Wainford's only answer is a challenge: "If any gentleman knows of a good deposit of feldspar near a railroad, we hope he will not be secretive, but show a broad spirit and put us in touch with this desirable spot." This challenge we accept.

(1). **Quantity.** We have referred already to the quantity of feldspar available in the Verona district. Perhaps it should be added that competent engineers have estimated that the Richardson Quarry contains at least 300,000 tons of high-grade feldspar; the same authorities believe that much greater tonnage is possible; but this tonnage they consider certain. Anticipating the improvements now being made in transportation facilities, some 4,000 tons of feldspar of a uniform grade are now ready for shipment.

(2). **Transportation.** There are a number of properties in this district, only a few of which have been developed. None of them have been on a railroad and this has held back greatly their development, as the bush road has been passable only during a few months of the year. However, this drawback is now being removed completely as a means of transportation will be completed as soon as the frost is out of the ground whereby shipments can be made at all seasons of the year. With the completion this Spring of these works, it is expected that all quarries in the district will be operating at full capacity.

(3). **Quality.** The analysis given in the Bulletins on Feldspar and records at Washington, London, Ottawa and Toronto earmark the Feldspars in the Verona district Ontario as being better than any produced in any country and in spite of the disadvantage in regard to lack of transportation facilities in the past they have always been able to get and keep a fair share of the high grade demand in the United States of America. This in itself is evidence that Canadian feldspar is in demand and well liked by those who use it. Bulletin No. 420 by Edson S. Bastin, issued by the United States Geological Survey is the most authoritative and comprehensive treatise on the feldspar situation in the Unite States. On page 9 of this report the analyses of two samples of ground commercial feldspar are given. Number 5 is from quarry in Maine, and Number 6 is from the Richardson mine at Verona. Speaking of these samples, Bastin says: "Samples Number 5 and 6 may be taken to represent as far as the percentage of quartz is concerned the two extremes among potash "spar" in commercial use. Number 6 is the best grade of Canadian Spar which is almost free from quartz and brings as high a price as any spar on the market."

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(1) **Editor's note.**—At the meeting where Mr. Segsworth presented the above paper, Mr. R. H. Wainford, president of the Trenton Flint and Spar Company, gave a caustic rebuttal of Mr. Ladoo's conclusion that the feldspar industry is at present run on wasteful and archaic lines, capable of radical improvement by the introduction of modern methods and machinery.

* Discussion of R. B. Ladoo's report on "Conditions in the Feldspar Industry" recently reviewed in these columns, at a recent meeting of the Ceramics Society.

THE CANADIAN MINING JOURNAL

1921

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Published Weekly by the Industrial & Educational Publishing Co. Ltd.
at the Garden City Press, Gardenvale, Quebec.

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Under Grade and Prices, pages 21, Bastin says: "Most dealers recognize three grades of commercial spar: No. 1, No. 2 (Sometimes called Standard) and No. 3. No. 1 is carefully selected, free from iron bearing minerals, largely free from muscovite and contains little or no quartz, usualy less than 5 per cent. Analysis 6 of the table on page 9 (see above) shows the character of material of this grade, the feldspar analyzed having been imported from Canada." On the same page Bastin gives a list of prices for crude and ground feldspar crude Canadian feldspar is quoted at 50c. a ton higher and the ground Canadian feldspar at $1.00 per ton higher than any other grade. In all publications on feldspar the Canadian feldspar is spoken of as the highest grade and analyses taken from Canadian quarries are given as examples of typical high grade, hard, potash feldspar. This together with the difference in price in favor of the Canadian feldspar indicates its high quality and its ability to compete with the best American feldspars. The discussion of a paper on feldspar read a year ago at a meeting of the American Ceramic Society at Columbus, Ohio, brought out the opinion that the Canadian feldspar was considered to be the kind of feldspar which the majority of the manufacturers need. Dr. W. G. Miller, Provincial Geologist for Ontario is too well-known an authority to need introduction and is noted for his conservatism. In a report issued to England he says: "The spar from the property to which I refer (the Richardson Quarry) is one of the purest and the deposit (of feld) the greatest that has ever been worked in any country." In a pamphlet issued by the Imperial Mineral Resources Bureau of London, it is said: "In the Vernon district the feldspar quarried is mainly high grade microcline." Practically all the pyrometric cones used in the United States are made by Professor Orton of the Ohio State University at Columbus, Ohio. Those cones are tested and against which all others are tried. They are made of a mixture of feldspar, flint and other materials. Since 1909 also all the glass tubing has been made of feldspar from the Bancroft district, Canada.

Geological Survey Parties in 1922

The Ontario Department of Mines during the field season of 1922, will carry on geological survey work from the western boundary to the eastern boundary of the Province; in all, nine geological parties will be in the field. At the head of these several parties will be the geologists on the Department's permanent staff, and also experienced geologists mostly from Canadian universities and elsewhere. The assistants are practically all university students of geology in their third or fourth year. In several instances, the Department is co-operating with that of Lands and Forests, under whose instructions surveyors are being sent to lay down base and meridian lines, traverse leading waterways, etc.

Beginning at the extreme west of the Province, the boundary line between Ontario and Manitoba is being extended northward from the point to which it was carried last year. This work is being done by a party under J. W. Pierce, O.L.S., the boundary commissioners being E. Deville for the Dominion, and L. V. Rorke for Ontario. The geological party sent out by the Mines Department will be under the charge of H. C. Hickeby, whose assistant is J. C. Macgillivray.

About 75 miles east of the Manitoba boundary, another geological survey party will explore along the English River, which is the boundary between the Districts of Patricia and Kenora. Dr. E. L. Bruce of Queen's University, will be at the head of this party. Dr. Bruce is well fitted to do this work, having examined the iron ore resources of Lake St. Joseph in 1921 and prior to that having geologically mapped extensive areas in Northern Manitoba, including the Flin Flon copper deposit. His assistants will be G. B. Langford, J. G. McCrea and W. R. Dunbar.

The geology west of Lake Nipigon will be explored along base and meridian lines being run by surveyors sent out by the Lands and Forests Department. The Ontario Department of Mines will have a geologist attached to each of these two parties. It will be the duty of these geologists to examine the rock formations and minerals along the newly surveyed lines, and to report as to the possibility of finding workable ores. Very little is known about the rocks and minerals in the area west of Lake Nipigon. One of the field survey parties will be working [illegible] lake and the geology will be investigated by W. H. [illegible] University; the other land survey party [illegible] ing south-west of the Lake [illegible] reported on by W. L. Savage, [illegible] versity.

R. G. McConnell, late Deputy Minister of Mines, Ottawa, will continue work in the Scott-Mac area, which he began last year. He will [illegible] Goudreau gold camp in order to [illegible] information as to [illegible] operating conditions there at the present time.

A. G. Burrows will spend the season in the Timiskaming gold area, where he will examine the more important workings of all the mines. His report will be of great interest, as it will make public a good deal of [illegible] bodies and structures. A visit to the Kirkland Lake, Porcupine and neighbouring camps, far from the beaten track, this year will afford [illegible] tion of the geology of Northern Ontario. The Porcupine camp is one of the world's greatest gold camps. Dr. Burrows' report will be [illegible] Lovell [illegible] will assist in the work.

Another party will be [illegible] Lake area, [illegible] the Porcupine camp, [illegible] Hearst, Kapuskasing, Mckinnon, Pearl[illegible] Gordon and Dack will be carefully examined. The geology in charge of Dr. F. W. Dodd, of Toronto University, assisted by C. P. Gadsden, G. D. Mooney, F. W. Robson.

E. E. Hegler will [illegible] township in the Kirkland Lake gold area and also the eastern extension of that area, namely, Gauthier township and Larder Lake. He will be assisted by W. Greenwood, E. B. Hosie and A. W. Carlyle.

C. W. Knight, Assistant Provincial Geologist, will spend some time in the South Lorrain district, [illegible] miles south-west of Cobalt, and a map [illegible] of this interesting and [illegible] will be made. It is hoped [illegible] report on Cobalt published about [illegible] of 1923. It will be complete [illegible] of the geology of the producing [illegible]

Prospectors of the Cariboo--II

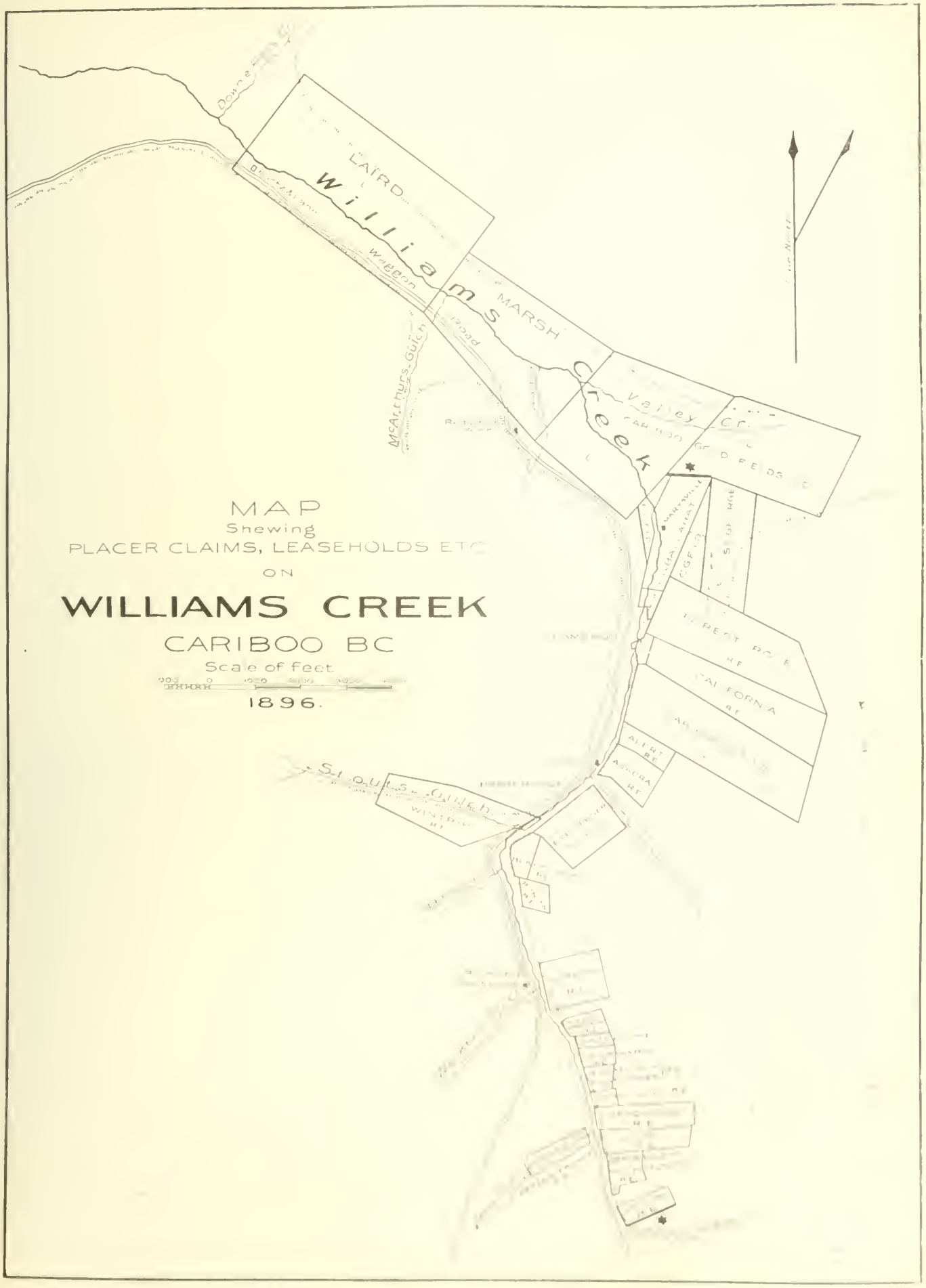
BY ROBERT DUNN

(Continued from page 269)

In discussing present-day placer mining men in British Columbia no story of George Adams comes to mind. When I say this of George my reservation of Fenimore Cooper's famous character "The Pathfinder" always occurs to me—a strong, big, able type that can eat and sleep a lot, goes to the winter or summer trails of the aborigines for a real "Pathfinder". I am not so sure about his marksmanship, but know that he has brought down a few moose and so far has been a good enough shot to avoid going seriously hungry when on the trail. A smattering of scandoughs, and while a dreamer, not a futile dreamer, George has left Atlin and elected on hydraulicking enterprise on Thibert Creek, near Dease Lake. He took possession of a plant consisting of several monitors, a line of flume more or less dilapidated, sluice boxes, and some house covering. This had been left when the war broke out. The workings were then in charge of the late Warburton Pike, a distinguished big-game hunter, and the rest for the most part were young Englishmen. The last named were "rearin' to go" when news of war reached the North, and in justice it should be said that the one German in the crowd threw down his tools and went out with the party impelled by similar patriotic motives. When Adams took hold late in the season of 1919 he had to repair the flume in order to get water, make other repairs to the plant, clean up after his predecessors—for they had not even waited to make their final clean-up—and open up a new pit. He chose virgin ground for this, locating on what he judged to be the old channel of the stream. How sound his decision was may be estimated when it is said that from a few square feet of ground he took in only a few weeks $14,000 in coarse placer gold and nuggets.

The summers of 1920 and 1921 have been used by Adams in getting his proposition in shape for continuous operation. The re-building of the flume to assure a large and steady water service was one prob-

Williams Creek, Cariboo, B.C. — Photo taken in 1868.


MAP
Shewing
PLACER CLAIMS, LEASEHOLDS ETC
ON
WILLIAMS CREEK
CARIBOO BC
Scale of feet
1896.
LAIRD
Williams
MARSH
Creek
Valley
McArthurs Gulch
Wagon
Road
Dome
CALIFORNIA
ALBERTA
SLOUGH

lem and the most important. There also was the transportation of additions to his equipment and its installation. All was set last season when the bank caved in and had to be cleared. So the past two years have been spent by this prospector and operator in hard work on the ground. He was "out" this winter but just for a few weeks. Already he has returned to Atlin. In December he and his wife came several hundred miles by dog team over the snow to Atlin. Thence he continued to the Coast and, his business completed, is back waiting the first opportunity to start work. All is now in readiness for sluicing and, if the ground is as rich as all indications seem to assure, his leases will be the nucleus of a highly-productive new placer field.

It is a real pleasure to know men of the George Adams class. They are peculiar to mining camps. Their simple directness is refreshing and their confident optimism is inspiring. When I first met George he was "out" after about 10 years straight "inside", and was shying at automobiles like an unbroken colt in heavy traffic. His last sally this year was that it looked like he'd make his "pile" and, as the Parliament Buildings looked good, might consider buying them for his town residence.

With our friend the prospector making elaborate preparations for a survey of the hinterland of the Omineca; with hydraulicking and dredging more than usually active in the Cariboo, Atlin, Dease Lake, and elsewhere in the Province; and in view of recent news that the Peace River Gold Dredging Co. Ltd. has entered upon dredging operations in a large way on thirty miles of ground between Fort St. John and the intersection of Half Way River on the Peace, it would appear that the production of the placers of British Columbia is due for a substantial increase.

If we consider future possibilities in the light of past experience there is justification for optimism. It was stated at the last annual meeting of the British Columbia Division of the Canadian Mining Institute that Williams Creek, Cariboo, produced between $8,000,000 and $9,0000,000 in gold. I looked up the Annual Report of the Minister of Mines for 1896 in this connection and find that these figures are misleading. They indicate only a part of the truth. Up to and including the season of 1895 a two and one half mile stretch of the placer ground of this creek, in other words that portion lying between the lower end of the Ballarat Claim to McCallum's Gulch yielded $19,320,000 in gold. It would be interesting to know whether there is another placer gold waterway in the world with such a record. Certainly these old statistics will be an eye-opener to many who have forgotten what was done by the miners of the Cariboo.

A sketch of Williams Creek accompanies this article. The well-known old claims are plotted and named. The gold production of some of the richest of these properties as recorded in 1896 is given as follows: Marysville, $300,000; Phelan and Hart, $250,000 each; Adams, $300,000; Cameron, $800,000; Ruby, $500,000; Forest Rose, $480,000; Watty, $300,000; Tinker, $300,000; Moffat, $250,000; Caledonia, $750,000; Aurora, $850,-$350,000; Ericson, $500,000; Barker, $600,000; Canadian, $350,000; Diller, $350,000; Black Jack and Bruns Tunnel, $675,000; Taff Vale, $300,000; Cunningham $250,000; Steele, $600,000; Phoenix, Bradley-Nicholson and British Queen, $680,000; Conklin's Gulch, $765,000; Mc Callum's Gulch, $200,000. Others range all the way from $25,000.

Turning to the report for the year 1897 a pertinent paragraph is found with reference to the production of the Cariboo District in general and Williams Creek in particular. To quote: "Since the year 1858 to the present it is estimated that over $35,000,000 in gold has been taken from the Cariboo gravel deposits, of which two and a half miles of Williams Creek yielded up over $20,000,000. The production of Williams Creek, Light-

"Aurora" Claim, Williams Creek, Cariboo, from which 483 ounces of Gold were taken in Twelve Hours.

ning, Lowhee, Antler, Grouse, Keithley, Hardscrabble, Cunningham Mosnito, Nelson and other creeks of those early days has become historic. Other creeks and untouched gravels may yet be found in this region, although the prospector has been searching for many years, but only twenty miles from Barkerville, it is claimed, lies ground that has been but scantily worked; however, the great interest that has now been aroused by the great Yukon discoveries will lead many to explore a great extent of territory in this northern country as yet untouched, to test many of the creeks by sinking to bed rock where only the bars have been tried."

And so to the early history of the Golden Cariboo closed. The eyes and the footsteps of prospectors turned to the Yukon. The halcyon days of the wonderful gold mining placer camps of that Territory also have passed away. Attention there now is held by the silver treasures of the Mayo. Its lure is powerful, but it lacks the magic of gold. Still the spirit that was manifested by "Caribooans", (that was Service's inspiration when he penned those verses in the "Land of the Midnight Sun") persists among the prospector and the frontiersman. Men are looking for the next great discovery and one wonders—has the great untrodden North still any hidden secrets such as were disclosed by the placers of Williams Creek and the Eldorado?

"The Prospectors' Shanty", verses written by James Anderson, tell the story of the life of the Cariboo miner so tunefully that perhaps it is worth quoting:

See yonder shanty on the hill,
'Tis but an humble diggin',
Some ten by six within the wa's—
Your head may touch the riggin'—
The door stands open to the south,
The fire outside the door;
The logs are clinket close wi' fog—
And nocht but mud the floor—
A knife an' fork, a pewter plate
An' cup of the same metal,
A teaspoon an' a sugar bowl,
A fryin' pan an' kettle;

The bakin' pan hangs on the wa'
Its purpose are twa-fold—
For mixin' bread wi' yeast or dough,
Or pannin' oot the braw gold!
A log or twa in place o' stools,
A bed without a hangin',
Are feckly a' the furnishin's
This little house belongin';
The laird an' tennant o' this sty,
I canna name it finer,
Lives free and easy as a lord,
Tho' but an "honest miner."

GOWGANDA AND OTHER SILVER AREAS

In Part III of the Annual Report of the Ontario Department of Mines (Vol. 30, 1921), Mr. A. G. Burrows describes the present appearance of what was hailed twelve years ago as a second Cobalt. The high hopes of those days have failed of fulfilment. Still, a district that had shipped, to the end of 1920, a total of close on six million ounces of silver, and whose annual production has not begun to decline seriously, is worth the added attention now given it by the Department.

Mr. Burrows has followed the fortunes of the Gowganda silver area from the beginning, as the representative of Ontario's geological staff. His present report is the result of thorough examination, and his conclusions represent mature deliberation. The following are some of the outstanding points, from the economic standpoint.

The silver-bearing veins so far located are all associated, as at Cobalt, with an intrusive sill or laccolith of diabase of Keweenawan age. At Cobalt the productive veins are found at or near the lower part of the sill, either in the intruded rocks or in the diabase itself. At Gowganda, on the contrary, the production veins are almost altogether in the upper part of the sill, or close by in the greenstone and conglomerate cut by the diabase. For instance the Milles Lake O'Brien veins are in diabase, while the adjoining Milleret veins are in the conglomerate overlying the diabase. The veins of the Castle property extend from greenstone above the sill into the sill itself. These are in the present productive area, in the vicinity of Miller Lake. The first discoveries in the district, on the west side of Gowganda Lake, were veins wholly in the diabase, those of the Boyd-Gordon and Mann claims being in the upper part of the sill, and those of the Bartlett claims (the exception to the rule), in the lower part.

The silver-bearing veins are composed mainly of calcite and quartz, often associated with little aplite dykes. Beautiful specimens of arborescent silver imbedded in black calcite are characteristic of the district, two of these being illustrated in the report. The paying ore shoots are ordinarily small, and on most of the properties have not been sufficient to repay consistent mining. The operating properties round Miller Lake have, though, yielded a handsome profit.

This new report by Mr. Burrows, bringing up to date the information about an old district, is timely in view of the renewed interest in the field being shown at present by prospectors and investors. It is such thorough pieces of geological work that have won for the geologists of the Ontario Department of Mines the reputation they enjoy.

NEW MAP READY

The Ontario Department of Mines has just published Map 30d., *Boston Shoal Gold Area*, district of Temiskaming, (scale 4 inch = 1 mile), which is to accompany the report (now in the press) on that area by Messrs. A. G. Burrows and P. E. Hopkins. The report will be Part 6 of Volume 30 (1921).

One of the Journal's contributors, Mr. Roland H. Briggs, of London, England, has recently been elected an Associate Member of the Institution of Mining Engineers, as well as a member of the Society of Engineers. He has also been awarded lately the Bronze Medal of the London Chamber of Commerce for an essay on "Mining in North Wales".

Hardinge Company, 120 Broadway, New York, have issued a new condensed bulletin covering the Hardinge Conical Mill.

This bulletin covers in a concise manner the principle of operation of the mill, its adaptability to industrial and metallurgical grinding problems, and gives general dimensions covering the different types of mills, as well as tables showing sizes, powers, and capacities for different conditions of grinding.

News of Mining

According to the United States Bureau of Labor Statistics, the wholesale prices of metals and metal products are relatively lower than those of any other group of commodities. Taking prices that obtained during the year 1913 as a basis of 100, the wholesale prices of metals and metal products stand now at 111. Building materials, in which group the greatest rise is observable, stand at 202, whilst the group next lowest to metals is that of farm products, reported at 128.

The 33⅓ per cent. import duty placed on chemicals entering Great Britain has had the effect of increasing prices by more than 15 per cent.

Only 18,200 short tons of crude potash salts was produced during 1921 in the United States. This represents a content of 7,618 tons of potash. About 80 per cent. of the production came from natural brines, but only a few plants, connected with cement plants and blast furnaces, reported continuous operation. The year's production was lower than that of any year since 1915.

Statements submitted at the annual meeting of the North Butte Mining Company, held at Duluth on April 17, show that their Adirondack vein, in the course of drifting done during the past year, varies in width from 1.8 feet on the 2,400-foot level, 4.2 feet on 3,400-foot level. On 3,600-foot level over 186 feet of drifting the vein averaged 3.1 feet in width and carried 7.7 pounds copper and 3.8 ounces of silver per ton.

The total exports of refined copper from the United States during the eight months ending February 28, 1922, amounted to 426,079,768 lbs., as compared with 302,147,047 lbs. during the corresponding period ending February 28, 1921. Germany took about 37.5 per cent. of the exported metal, Japan about 16.5 per cent., France over 15 per cent., while Belgium, Italy and Great Britain bought very much smaller quantities.

In a speech delivered at the Hotel Astor, New York, on April 21st, Mr. Thomas H. Watkins, president of the Pennsylvania Coal and Coke Corporation, declared that back of the coal strike lie "sinister influences at work to secure complete domination of coal production by a union not responsible for acts that might seriously affect the public welfare." The speaker further asserted that collective bargaining had "gradually faded away" and that for it "was substituted collective threatening." In Mr. Watkins' opinion the Sherman Laws and Clayton Acts prevent operators from co-operating to improve the general conditions of the coal industry, and militated against finding a cure for intermittency of employment in bituminous coal mining.

The 1921 output of iron ore in Russia amounted to 1.59 per cent. of the output in the year 1913, the manganese ore output to 1.04 per cent., and the copper output to 0.4 per cent. All labour is under Soviet control. Copper smelting has ceased entirely.

In reviewing last year's operations at the Rio Tinto, Spain, Sir Charles W. Fielding, K. B. E., stated at the company's recent annual meeting, that sales of copper bearing pyrites and of washed ore had fallen off because of the strike and because, also, of competitors having entered the market during the strike. It has been found, however, that Rio Tinto ore can hold its own in most of the markets. After touching on the past unsatisfactory condition of the copper market, Sir Charles made the following pronouncement: "Of all the large mines, our Company is able to produce its copper at the lowest cost per ton, and, therefore, while the market price of the metal, when below the normal, reduces your dividends, your Directors are able to ... carry on their operations without being too much influenced by the world's copper prices." The Rio Tinto Company now pays out £27,000 annually in pensions to old employees, and, in addition, has to meet heavy taxation and pay increased import and export taxes.

After acquiring oil claims in the Many Island district, 25 miles north-east of Medicine Hat, Alberta, The Harmony Estate (Transvaal) Development Company, Limited, obtained the consent of its shareholders to delete the word "Transvaal" from its name. The Chairman, Mr. R. W. Mitchell, announced that the company is negotiating for the acquisition of gold properties in Canada.

Tasmania produced 1,750,655 ounces of osmiridium during 1921. The stated value was £42,935.

A comprehensive plan for the development of Peruvian copper mines has been adopted by the Northern Peru Mining and Smelting Company, a subsidiary of American Smelting and Refining Company. Options on the Quiruvilca mines and on the Almiranta properties have been obtained. It is intended, also, to open several known anthracite veins and to build a hydro-electric plant, 2,000 h.p., near Quiruvilca.

The Geological Survey of China estimates the coal reserve of that country at 23½ billion tons. This estimate, it is stated, excludes small seams and comprises only tonnage to a limited depth. The iron ore reserves are estimated at one billion tons. China could readily supply the world's demand for antimony, as her deposits are singularly rich. In tin production China ranks next to the Malay States and Bolivia, and produces 10 per cent. of the world's output of tungsten. Although China consumes enormous quantities of silver, her production is less than 50,000 ounces annually.

The Transvaal Chamber of Mines has expressed willingness to meet representatives of the Labour Unions, with the proviso that it will not deal with certain persons who were identified with the Joint Executive that controlled the recent strike. It is also stipulated the foremen must hereafter be recognized as officials and must in no circumstances become members of workers' Unions. The re-employment of ex-strikers is the question most urgently requiring settlement.

News and Comments

by Alexander Gray

"High Finance."

Having a doubt as to whether the promoters of London are altogther culpable for committing a misdance by dumping the Davidson — or Porcupine-Davidson — upon london and presenting it as a Canadian mining proposition, rather than befoul the pages of THE CANADIAN MINING JOURNAL with a more offensive characterization of the thing it is preferable to describe it as "high." That it is somewhat unsanitary, is admitted on both sides of the Atlantic. If it is an exhibition of the 1922 Spring Styles in London, the Canada's most incorrigible will have to yield the palm (and the cross) to those who take or have taken the proffered shares.

For months a copy of the propectus has lain upon this desk. It embodies the reports of three pesons who led London to believe the properties had everything possible to commend them. Details of production and ore reserves as estimated need not be reproduced. The reasoning was far-fetched. The ore was represented to be as good as the Hollinger. That the average of the ore-reserves and what was alleged to be the grade milled, did not jibe with the average recovery as reported to the Ontario Mines Department, was explained by the absence of cyaniding facilities. A loss of around 50 per cent of the gross gold content was assumed by the reportees.

So the bells were hung upon London, by Londoners, and now they are unhappy. They ought not to be with their own offspring, nor can they disclaim the parentage. So captivated were they with the prospects, and positive information supplied by their own technical advisers, with whom they are perfectly satisfied, they took all there was in it, diluted the capital, reserved for the Directors a goodly stipend plus travelling expenses, and an overplus of "five per cent of the annual distributed profits of the company." Nor do those tit bits end it. A salaried "one or more" (the more the merrier) Managing Director or Manager may be chosen from the Board, and the mandatory provision is that he or they shall be recompensed "as the Directors may determine."

Very considerately, the Preferred Shareholders have a participation in the profits (an impressive percentage) until the nominal worth of their shares is repaid to them. Before action is had in this respect the Directors have the ear marked five per cent if there is divisible profit or if a distribution is ordered. Ordinary shareholders are on the long distance with a bad connection. Canadians in Ordinary god money for their holdings; then the string was pulled and it landed in the new London corporation. Thereupon the vendors were awarded the agreed proportion of the London Preferred and Ordinary issues. In brief, this is how we de-code the arrangement.

An apology is due to the chief sponsor resident in Pinner's Hall, for having intimated that he overlooked a Founder Interest in the corporation. His self-abnegation is the flaw in the picture.

Withal, it cannot longer be contented that London is not fully up to date. Between proferred percentages, fixed salaries, fees and "ex's", this is a development de luxe.

Over-Dressing "Hattie"

There is evidence that the "Hattie", located in Coulson Township is being rather meretriciously "dolled", which, it goes without much saying, is rather bad form for mortals, mines, or prospects. In directing attention to this, it is the special province of *The Canadian Mining Journal*, kindly to intimate that a "lady" mine should be circumspectly arrayed neat but not gaudy, as it were. This does not imply that "Hattie" is not all she should be. Quite to the contrary; for Percy E. Hopkins of the Ontario Geological Bureau in his historical summary of gold mining in Ontario, distinctly states that "the Hattie encountered some rich showings during shaft sinking in 1921". So "Hattie" has some ornate furbelows, which even a rock-knocker could not but admire, it being his privilege to take note of them, and to do it minutely.

Possibly it is ungentlemanly to go further, and better to take the word of Mr Hopkins for it. And yet the "General Manager of Hattie Gold Mines" (who was Mining Recorder at Matheson "for many years") lowered his guard—left an opening—when he indited an over strained epistle to the public, containing this among other statements:

"There is ample precedent, not only in Canada but elsewhere for believing that the final results will justify present indications, namely, that a large deposit of extremely rich ore will eventually be mined from those workings. The $1,000,000 mined from the Croesus, only a few miles away, in the course of six months, is one illustration close at hand."

That is a trifle "de trop." Ignoring the comparison between "Hattie's" gorgeousness and Hollinger dowdiness (the "$17 average value" as against the Hollinger "about half of that") the General Manager became rather involved when he threw the responsibility for success upon "final results" which are not always in accord with capitalization nor with the ephemeral production of a rich but short lived neighbor. No doubt Croesus was a prize beauty. It was a delinquent half year however and instead of the million credited to it by the ode to "Hattie" it is at extremely matter of official history that the Croesus "up to the time operations ceased in February 1918 had produced 12,170 ounces or $250,953 in gold." What one was entitled from that property's acknowledged to have been the richest ever found in Ontario, but the exaggeration on behalf of "Hattie" suggests the need of censorship. A statement of the sort is not prospectus sounds all the more ripe this. It may be that the [illegible] are likely to live up to very great hopes [illegible] the Croesus and it is admissible that there [illegible] long lifetime ahead of it, but the [illegible] the best [illegible] or [illegible] the General Manager might [illegible] upon the attitude of which is not easy [illegible] with Ontario.

A [illegible] regard for the integrity of Ontario [illegible] prompt us to say that [illegible] General Manager states [illegible] at [illegible] to [illegible] Wh[illegible] the mention when the book of [illegible]

is apt to "furnish, at least, one car of high grade ore a week from development operations alone", and "this ought to return from $5,000, to $15,000 a car, on the basis of the values exposed":

"Hattie" is too ravishing — or has been made to appear so. But this conclusion does not mean that "Hattie" is not the "prospect" Mr. Hopkins says she is.

How to Make Business

So pre occupied are some of us with the economic ills we should forget, so wedded are many to their misfortunes, that but slight heed has been given to the significance of the appeal of the Anaconda Copper Company and Zinc Producers in general to their shareholders to popularize metal shingles. It is a mere detail, perhaps, to have John D. Ryan and his colleagues point out that copper and zinc are cheap and metal shingles economically effective. The same enterprising organization, by acquiring control of the American Brass Company, also undertakes to broaden the markets for copper and zinc as brass. Bulk consumption is sought. American companies need the business and are going after it, while Canadian metal industries are hesitant.

Undoubtedly the Nickel Industry will emerge from its depression by evolving new uses for the metals, but heartier co-operation by the public would hasten the revival of production. At Trail, more finished products are planned for. Without joepardizing export trade more asbestos might be fabricated. As to the Steel Industry; the tendency is to belittle the magnitude and importance of the greatest of Canadian mining enterprises. Germany has contracted for hundreds of thousands of tons of Wabana ore, while the integrity of the corporations producing this are questioned in banking and business circles. Independent steel companies in the States are combining for an offensive, and the arrangement is applauded. The British Empire corporation in Canada was created for the same purpose, and it is "given the hook" by those who ought to understand how vital it is that the coal and iron deposits of the Maritime Provinces be standardized and adequately financed for the greatest operations. Where there is need of accord, there is discord. It must be obvious that the American programme for the resumption of activity is more creditable than the Canadian idea of carping and indecision.

Wall Street View of Three Gold Mines

"Here", writes Mr. Hartleigh in the April 29th issue of *The Magazine of Wall Street*, we have several very interesting mines, particularly Hollinger, McIntyre and Dome. The first is an investment in the true sense of the word, with adequate reserves of payable ore blocked out, with extensive promising territory awaiting further development, and with first-class management equal to any operating problem that the company is likely to meet, if their record is significant in this respect. Hollinger Income Account and Balance Sheet indicate stability and increasing strength."

More in compliment could not be urged. It is frankly acknowledged that the return upon Hollinger shares at the market price, is not adequate. But the treasury, ore reserves and prospects, and certainty of greater milling capacity insuring larger dividends, make the Hollinger a speculative investment "in the true sense." That is the very reason why the chief owner of Hollinger deprecate market overvaluation of their shares. The present return must suffice, until a larger dividend can be assured continuously.

The point is made by Mr. Harleigh that the McIntyre is a most interesting mine with very bright prospects. He directs attention to the market position of McIntyre shares which, at the time he wrote, were on a 4 per cent. basis. Conceding that McIntyre milling capacity will be increased, that larger dividends should be forthcoming, anticipation of this (and it will take a year or two to establish) leads Mr. Hartleigh to maintain that McIntyre shares are too high. This is not recorded captiously. The same reasoning is applied to the Dome, in which case it is emphasized that there have been no estimates of ore reserves of late. Doubtless, Mr. Hartleigh reckons, the Dome structure does not lend itself to long-range forecasts, and yet the management is commended, as well as that of the McIntyre.

The factor of longevity is taken into account by *The Magazine of Wall Street*, notwithstanding it was a month or two ago only the same writer registered his belief that Canadian gold production is decreasing. Hollinger is hypothetically conceded a life as real mines, deserving of profound respect. Of the of "10 or 20 years". McIntyre and Dome are accepted trio, however, only one bears comparison with the Homestake, which distributed $31,000,000 in dividends since 1879. In ten years the Hollinger has paid its shareholders approximately $17,500,000. Homestake shares at $74 after all these years are on a 4 per cent. basis. The difference is that Homestake low grade ore is 60 per cent., free milling and the 43-year producing record makes it a criminal offence for anyone to quibble about its future. The past is beyond anything of that sort.

To have American journals devoted to the investment aspects of industries and mines concede the superiority of these Ontario properties, should inspire confidence that there will be others. There are others, and there will be more, if some of those in the stock exchange limelight do not "run past themselves", as was said of other men and things.

"Arrangements Made"

Daily newspaper announcements that P. Chester Thompson, President of Thompson Oil, Sanctuary Oil Company and Royal Canadian Syndicate, has made arrangements for the development of the Lake Pakowki section concession, may lead to something beyond a script-selling campaign. A Curb "dope" sheet published at New York, "The Eye", has it that the Pakowki "dome" is the superlatively greatest of its kind since the spheres were domed with the aurelian. Royal shares passed across the counter have been going at over $400 per unit. That Mr. Thompson is enterprising, is unquestioned. Last year he sought one or two hundred thousand acres of Canadian Pacific lands for exploration. He and his New York confrères control though the several incorporations enough acreage to be proved or disproved in a series of drilling seasons. As the Ottawa Government became a partner in the Pakowki matter, no doubt Mr. Slipper, who sponsors the Pakowki country will see to it that no rights are lost, to the Government or to the Thompson organization. It would be consolatory to have Southern Alberta more satisfactorily supplement the Fort Norman production, now reported to be "seven barrels a week!" "Charge, Chester, Charge!" Somehow we must find oil in the West.

Notes From Nova Scotia

Conciliation Board Begins Investigations

The members of the Conciliation Board appointed to inquire into the miners' wage dispute in Nova Scotia, met at the Court house in Sydney and after a short session adjourned to make an inspection of the collieries. The Board comprises D'Arcy Scott, Ottawa, (chairman), J. E. Moore, St. John, N.B., representing the Dominion Coal Company, and Isaac D. MacDougall, Inverness, representing the mine workers.

It is understood that the Board has instructions from the Minister of Labour to make a thorough investigation into all conditions at the collieries. Just why such instructions should be issued to this particular Board is hard to understand, seeing that two years ago a Royal Commission appointed by the Government made a most searching investigation into all conditions of mining and their report is in the hands of the Labour Department at Ottawa.

The instructions of the Minister however, may only be to make inquiry into the conditions affecting the wage dispute. If so, the matter will be simplified and can be carried through in a much shorter time. The Chairman has announced his intention of making full inquiry into wages, cost of producing coal, coal market prices and other conditions, and basing his award on things as he finds them. It is hoped that the award will bring peace to the coal miners of the Province. Four months have already been wasted in trying to reach an agreement that should have been made last November.

One of the chief arguments used by the mine workers of Nova Scotia in their wage dispute is "that mining towns have a much higher percentage of infant mortality than most other towns, because of malnutrition due to low wages and inability to procure proper nourishment for children." After being advertised and placed in a most unenviable light as the worst city in Canada for high death rate of children, it has been discovered that Government statistics are incorrect, that instead of 245 births registered, there were altogether upwards of 900 births, most of which were not registered. This changes the percentage of deaths from thirty to eight, and at the same time places Glace Bay well ahead of other large towns. So, unfortunately for some of the "Reds" among the miners, another part of their argument has been punctured.

Drawing Pillars from Submarine Seams

The Dominion Coal Company, Cape Breton, have begun drawing pillars for the first time in their largest undersea Colliery, No. 2. As another seam overlying this one is being worked by a separate shaft, it was found necessary to stop mining above until the pillar work below is well advanced.

It is reasoned out that if work is concentrated on pillar sections and these are rapidly extracted that the subsidence will be gradual and the strata will settle without danger of fractures running to the surface, which would not only be dangerous under heavy bodies of water, but would effect the workings of the upper seam.

The mining of coal undersea requires great care. So far it has been costly, as thick pillars had to be left while entering the submarine field. Heavy barrier pillars between sections must be left in case of an accident, or inrush of water. Now that the Collieries are reaching the stage where pillars can be drawn the necessity for continuous development will not be so great.

There is 1600 feet of cover over the pillars of this Colliery at the point of pillar attack. Between the upper and lower seams being worked there is 450 feet.

Before this step was taken the Company had the advice of a British expert who was brought over last fall to advise on this and other work. It was found that his opinions agreed with those of their own mining engineer, Mr. Herd. The best in mining science has been brought to bear on this problem, and success is undoubtedly assured.

The fact that a mine will be laid idle for a year or more with consequent loss of output shows that the Company at great cost is taking the utmost precautions to protect the lives of their workmen and to preserve their Collieries from all the dangers and loss of coal which would result from bad methods of mining. This is true conservation in mining, and will give the greatest possible percentage of coal under the difficult conditions of the Glace Bay coal fields.

While the pillar work of No. 2 Mine is being advanced according to policy, the workings of the upper mine will be put into first-class repair for large outputs when the mine reopens.

New Safety Lamp Tester.

A mechanical safety lamp tester has been made under the supervision of Alex. McEachern, Chief Inspector of the Dominion Collieries, Glace Bay. For years Mr. McEachern had been of the opinion that the lung test of safety lamps was not a safe test. No man who gives out three or four hundred lamps in an hour can blow these with the necessary force to prove their safe condition. It has long been suspected that deficient lamps have been responsible for mine explosions, yet these same lamps passed the lung test at the lamp stations. Experiments were carried out with four lamps to prove the efficiency of the new mechanical tester. Two of these lamps were first rendered unsafe by placing two plies of paper between the gasket and the glass. Several men applied the lung test but only two men were able to blow the lights out. The new tester instantly extinguished the lights in both lamps. The other two lamps were considered safe; but one was blown out at a pressure of three pounds. The other lamp stood a pressure of seven pounds. The ordinary lung test is one pound.

The safety lamp under the new test is enclosed in a cylinder making air tight joints above and below the glass joints when the air is applied, and all parts are subjected to the same pressure. A gauge is attached and set to the standard of pressure agreed upon. Besides the gauge, a gong set off by a pop valve will be attached.

Hugh McNeil, District Mechanical Superintendent, and Colliery Superintendent Wm. McKay, New Waterford, made the mechanical tester. It will be used at all the Dominion Collieries.

A number of the Government Mine Inspectors and Mine Officials from other districts were present at the final test. All were pleased with the results. All were pleased with the results. The Technical College, Halifax, has been asked to examine it and report their findings to the Government, after which it will be put into general use.

British Columbia Letter

The Cedar Creek Claims.

From the midst of a medley of confusing stories regarding the Cedar Creek gold discovery, Cariboo District, comes the account of Russell R. Walker, a well known British Columbia journalist, who has returned after spending two weeks or more on the ground.

Mr. Walker's statement of the conditions and the outlook may be accepted as authentic. Messrs Lynes and Platt are given as the original discoverers. "Instead of prospecting only along natural waterways," he says, "holes were dug hundreds of feet above the creek in the most unlikely locations. Experienced miners are puzzled over the strike and, looking at the pay dirt, it would never be expected that gold would be found. There is little or no wash where operations are being carried on near the 'glory hole.' Broken rock and shale are mixed with a black clay on bedrock and the placer expert admits himself completely 'stumped'.

"On the Platt claim, where three men have been working for weeks, over $100 a day is being taken out by the crudest methods. No sluices have been installed, but an ordinary rocker or cradle is being used. Most of the pay is being lost to be recovered later when more adequate methods are used. The present work is being done to ascertain the extent of the claim's wealth."

It is asserted that Messrs Lynes and Platt have found a buyer, a deal having been completed for $300,000 for two claims, $20,000 down and the balance payable as the gold is recovered. An engineer's report anticipates that the two claims will yield from $3,000,000 to $4,000,000.

Mr Walker continues: "Last fall the heavy rains hindered the work of prospecting and the miners were flooded out. However, they secured rich pay in different spots. I was shown where $300 was washed out of a yard of dirt. After taking out about $1,000, attention was turned to testing out the claims and the miners sunk to bedrock at different places. It soon was found that an old river bed had been discovered. This is about one hundred feet wide and shows good wash. A hole was put down but was prevented from reaching bedrock. Fond hopes are based on this channel and a pump has been ordered to drain the hole.

"Should pay be struck in this channel, Cedar Creek will come into its own. The old river course has not been definitely traced, but for at least five miles it can be followed. The gravel is not coarse and but few rocks are found. The wash is identical to that of Bullion Pit, one of the richest hydraulic properties ever operated in the Cariboo.

"But Cedar Creek does not appear to be a hydraulic proposition. There is a great deal of heavy timber, thick undergrowth and the prospect of many buried logs. It looks like a one-man game, with the prospect of the claims being cut up into small 'lays' and worked with rockers, grizzolys, and sluices. R. Crowe Sowards and associates are installing a dredge at the mouth of Cedar Creek and their progress is being watched with interest. The difficulty of obtaining water is likely to prove a handicap. At present the spring seepage is not very marked, and on the Platt claim only enough water was running into the ditch to enable the miners to rock four hours a day.

"The syndicate which purchased the Lynes-Platt property has applied for a water right at the head of the creek and may instal a dam. This summer their operations will be confined to rocking and sluicing. A 'sump' will be provided to gather sufficient water to wash, and from twenty to thirty men will be put to work."

On the point of the gold so far recovered, in connection with which they have been many accounts, Mr Russell states that "there is no doubt that hundreds of dollars have been washed out in one day by two men. Pockets have produced as high as $500 per cubic yard and I washed different pans of dirt picked at random, which showed values of from 15 to 20 cents. On the Platt and Lynes claim a good deal of rough gold is found while a few hundred yards off the yellow metal shows signs of having come some distance. There are few large nuggets and practically no flour gold. Two yards of dirt on the Platt claim yielded $300 in three hours. The gold was all fine. Some of it was rough. A short distance away coarser gold was found and the values occurred from within a few feet of the surface. Bedrock is only three feet down in some instances and twenty or more in others."

It will be several months before the new field is proven. Already there are over 350 men in the district and the ground on Cedar Creek has been taken up. The amateur without capital is cautioned to keep away. For the prospector with a summer's grub-stake the opportunity is there, as "there is gold a plenty but, like most of the good things of life, it comes to the "go-getter." The establishment of the boom city, to be known probably as Cedar Creek City, is predicted. But there is no evidence, nor is there likely to be, of the gunman, the booze emporium, or the dance hall. The carrying of guns already has been prohibited. Cedar Creek City will be a businesslike community. It is easy of access. One can leave Vancouver on Tuesday morning and be at his destination Friday afternoon. When the roads improve the run can be made easily from Williams Lake by motor, when Cedar Creek will be only two days travel from Vancouver.

Activity in Revelstoke District.

The Multiplex Mining Milling & Power Co. Ltd. held a meeting recently at Revelstoke, B. C. at which officers were elected as follows: President O. T. Bibb; secretary, J. Stevenson. It was decided that a small crew would be kept at work at the mine, which is situated close to Revelstoke. Development at present consists of drifting on the lead in the second level to tap a new ore-shoot which shows good concentrating ore at the surface.

The Waverley-Tangier group of mineral claims, Revelstoke Mining Division, has been bonded by Spokane and Chicago men, and the old workings are to be opened this year. The Waverley Mines Company has been incorporated with the capitalization of $600,000, and John Forbes who has considerable experience in mining in the West is in charge. There are two main veins; the Tangier, which varies from three to five feet in width, and the Waverley, which is from 18 inches to 4 feet wide. Both are fissure veins, and both have been traced on the surface for more than two thousand feet. From these there branch replacement

veins, similar to those found at the Florence mine near Ainsworth. The Company proposes building a new road a part of the distance from the C. P. R. to the property. The ore will be shipped on trailers drawn by a Holt Caterpillar tractor.

The Pioneer Mine and mill will be active this summer. The property is situated in the Bridge River district. A new cyanide plant is ready for operation.

The Trail Zinc Schedule.

The first zinc schedule ever issued by the Consolidated Mining & Smelting Company of Canada has been published. It marks a new departure in British Columbia mining, and should bring many properties of the Slocan and Ainsworth District from the class of doubtful enterprises to that of sure profit makers. The innovation is hailed by mine operators of the Kootenays as ushering in a new era for those sections as far as mining is concerned.

For straight zinc ores the schedule comes into effect at once, but for the great bulk of zinc ores— those that contain values in gold, silver and lead sufficient to make their recovery desirable—the schedule will take effect only when the Trail corporation has completed and is ready to operate its special custom zinc plant, on which construction is progressing. It is expected that this will be ready some time in June.

It is difficult to over-emphasize the importance of this announcement to the Kootenays. The Consolidated Company has conquered the complex ores of the Sullivan Mine. The Company now is extending the knowledge acquired to the treatment of the zinc ores of the Slocan and other districts for the benefit of independent owners and all potential shippers. As the zinc stopes of the Slocan are very numerous, ore that was formerly not available and that in fact was waste now becomes a distinct asset.

Summarized, the schedule provides a sliding scale of percentages of the zinc paid for, increasing with the zinc tenor of the ore, with payment for zinc at 3.6c. off the London quotation of the week of arrival. In 30 p.c. ore the Smelter will pay for 60 p.c. of the zinc, and this ratio increases until a maximum of 85 p.c. of the zinc is paid for in ore running 50 p.c. zinc or over.

In addition to payment for the zinc, the schedule also provides for payment of 80 p.c. of the gold, for 80 p.c. of the silver, and for 80 p.c., less 5 units, of the wet lead. The recoveries of these three metals will be in the smelting of residues after leaching out the zinc, and a scale of smelting charges is provided, decreasing as the zinc tenor of the ore increases and the percentage of residues lessens.

It is believed that this is the first time that so high a percentage of gold and silver has been paid for in a zinc ore. So far as the lead is concerned, it is the usual practice for the lead in a zinc ore to be penalized.

One comment made is that an outlet now is provided for zinc concentrates from the mills of the district. Where a Slocan mill, for instance, produces both lead concentrates and zinc concentrates it readily markets the lead concentrates, but it has been a different matter with the zinc concentrates. Some of the latter have been shipped to United States smelters but never with much prospect of reasonable profit because of freight charges and of tariff duties. In many of the mines in question a considerable part of the silver values is in the zinc concentrates, which heretofore has made the situation more difficult.

Placer Mining in Cranbrook District

Hydraulic placer-mining is to be continued this summer on Wild Horse and Perry Creeks, Cranbrook District. Leases are held on these waterways respectively, by the Gamble Mining Company, and the Wild Horse Creek Placer Gold Mining Co. A. J. Palmquist who is interested in the operations on Perry Creek, states that this property has been purchased from the original owners for $40,000. Last fall considerable work was done in improving the plant and making preparations for the start of work this year. There are 19,000 feet of fluming and 1600 feet of inverted syphon, giving a water elevation of 150 feet installed. He is looking forward to very successful results this season.

W. H. Armstrong, a prominent western contractor and mining man, died recently in Vancouver. A high tribute was paid to his work by members of the Vancouver Branch of the Canadian Institute of Mining and Metallurgy. It was pointed out that he had much to do with the founding of the fire-clay, refractories, and brick industry of Clayburn; the development of coal mining at Merritt, the development of the Ikeda Mine at Queen Charlotte Island, and exploration for coal and other minerals in the Similkameen District, Queen Charlotte Islands and other portions of the Province. Mr. Armstrong had long been a member of the Institute.

The last report of the Belmont Surf Inlet Mines, Ltd., is satisfactory. It shows that the mine made profits of $45,363.11 for the closing quarter of last year. As conditions are improving it is likely that the payment of dividends will be resumed shortly. During the early part of last year the Company operated at a loss. Recently however, development has progressed so well that important ore reserves have been blocked out, and an adequate supply of millfeed is assured. The Pugsley Mine is said to be producing ore averaging $15 a ton. This adjoins the original holdings of the Company.

Settlement of claims for damages against the Britannia Mining and Smelting Co., arising out of the disastrous slide of October 28th last, when 37 lives were lost at Britannia Beach, is under consideration. Claims for loss of relatives, personal injuries and damage to household effects and property aggregate $135,000. On behalf of the claimants it has been proposed that this sum be cut by 25 p.c. Unless the Company's representatives agree to these terms by May 10th next, action will be taken through the Courts.

There will be eight geological, and three topographical survey parties engaged this summer in British Columbia on the work of the Canadian Geological Survey. J. D. MacKenzie, head of the survey in this Province, returned recently from Ottawa, where he discussed with officials of the Department, plans for this summer's activities. He says that much work will be done in the Cariboo and Lillooet districts. "It is the policy of our office," Mr. MacKenzie stated, "to investigate regions where investigation is most needed. The purpose of a geological survey is to assist mining men in the development of new territory and wherever there is interest in new districts we try to give assistance."

Northern Ontario Letter

The Porcupine District

The second week in May finds the snow entirely gone from the bush throughout the mineral areas of Northern Ontario, with the possible exception of a few spots in the shaded areas of the swamps. Prospectors are showing evidence of greater activity than ever before in the history of the province. Careful observers are pointing to this as one of the most favorable signs in connection with the mining industry. Not only were the renewals of Miners' Licenses very heavy this spring, but mining recorders from one end of Ontario to the other are reporting a general increase in the number of new licenses being issued.

Districts that promise to be favored with a good deal of activity are the outlying section of Porcupine, the eastern part of the Kirkland Lake district, Goudreau gold area, the prospective placer area south of Lake Abitibi, the West Shining Tree district and the Lightning River field.

While the interest centres to a large extent on the prospective gold districts, yet the interest in certain of the silver areas is also on the increase. South Lorrain will come in for much activity, judging from the amount of work already under way and the large number of licenses being taken out by prospectors who are going into that district. Indeed, everywhere where there appears to be hope of finding precious metal in Northern Ontario, the smoke of the camp-fires of prospectors will be seen this summer.

Production in April

According to preliminary estimates the output of gold from the Porcupine and the Kirkland Lake gold areas amounted to close to $1,700,000 during the month of April, thereby attaining the highest point so far in the history of the industry in Ontario.

The Porcupine field was represented with three producers, namely, the Hollinger, Dome and McIntyre-Porcupine. These three mines produced approximately $1,475,000 during the month.

The Kirkland Lake field had five producers, namely, the Wright-Hargreaves, Lake Shore, Teck-Hughes, Kirkland Lake and Kirkland Lake Proprietary. These five mines produced approximately $215,000.

A feature of the April achievement was that it shows a current production of gold at the rate of well over $20,000,000 a year. Another feature of the situation is that activity is increasing in all directions, while at the producing mines there are big plans for increasing output.

The indications appear to be that a record of $2,000,000 a month will be made before another year is out with prospects of further substantial growth with the passing of the next few years.

Amendment to Town Sites Act

An amendment is being made to the Town Site Act, which is calculated to enable the holders of mining claims to lay out towns on the surface rights only, instead of being compelled to surrender mineral rights as well. Heretofore, on any townsite laid out, the Government took each fourth lot, along with the mineral rights. The new amendment will not include the mineral rights as is shown in the following bill:

Section 2 of the Town Sites Act is repealed and the following substituted therefor:—

(1) Subject to the provisions of subsection 2, where any lot or parcel of Crown Land sold, leased, located or staked out under any Act of this Legislature subsequent to the 19th day of March, 1910, is hereafter laid out as a townsite or subdivided into lots or parcels for town, village, park or summer resort purposes, one-quarter in acreage of all the lots or parcels shown on such plan or subdivision shall become the property of and be vested in the Crown.

(2) Where any land so laid out as a townsite, or so subdivided had been sold, leased, located or staked out under The Mining Act of Ontario, the ores and minerals under the surface of the land thus vested in the Crown, shall remain the property of and be vested in the person by whom the said townsite is laid out or land so subdivided and by all persons claiming under him.

This act will come into force on the first day of July, next. It will bring to an end an unreasonable situation.

Eight Miles of Shafts

Although the gold mining industry in Northern Ontario is comparatively young, it is nevertheless a point of interest to learn that the aggregate amount of shaft-sinking already amounts to close to eight miles, while the total length of drifts and cross-cuts will exceed 100 miles.

Approximate estimates of shaft-sinking at the gold mines follow:—

District	Feet.
Porcupine	16,000
Kirkland Lake	10,000
Boston Creek and Larder Lake	3,000
Bourke's and Munro	2,000
Matachewan and Shining Tree	1,300
North-Western Ontario	7,200
North Shore and Michipicoten	1,000
Total	40,500

In addition to the above figures, are numerous small test pits and works that would increase the total to at least eight miles.

Hollinger

During the four weeks period ended April 22nd, the Hollinger Consolidated treated 107,841 tons of ore, thereby maintaining its uniform record of recent months, the average being 2,887 tons every twenty-four hours. Allowing for a recovery of $9 a ton, the output for the period would amount to about $970,569, or at the rate of $12,617,397 a year. Everything considered it seems that the income of the Hollinger will exceed an average of a million dollars a month for the whole of the current year.

A vein is reported to have been cut during the course of doing some cross-cutting on the Porcupine Crown property at a point close to the boundry of the Hollinger. Whether or not the vein is of any special importance has not been announced.

In the checking up of the underground sampling of the Porcupine V. N. T. the mine is being found to be in even better physical condition than had generally been supposed. The outlook for the enterprise is good and the next few days will witness the work well on its way in connection with opening up the downward continuation of the present known ore-bodies.

McIntyre

The deep mining operations on the McIntyre-Porcupine are adding in a big way to the resources of the mine. Ore reserves will show a large increase at the end of the current fiscal year, according to reliable information. The company will close its biggest production record on June 3, in spite of which there will be an increase in ore reserves. It will only be a matter of a very short time when the new milling unit will be in operation, treating carbonaceous ores which were heretofore passed by. Some of this ore runs as high as $100 per ton in gold.

Another Consolidation

A movement is under way to bring about a consolidation of the Martin claim with the Preston-East Dome, according to information reaching here. These properties lie to the south and south-east of the Dome Mines and have the continuation of a tongue of porphyry formation which runs north and south from the Dome on to the Preston-East Dome.

From a geological point of view, the possibilities of these properties are attractive.

KIRKLAND LAKE FIELD

Sylvanite

The shaft on the Sylvanite mine has reached a depth of about 500 feet. Within the next week, the 520-ft. level will be reached and the work of cutting a working station will be commenced.

Developments at the 390-ft. level were favorable, the main ore body having been cut, in hich the values were such as to classify it as ore across a good stoping width.

The new electrically-driven hoist is in operation and everything is in shape to make good progress in the lateral work that is to be undertaken at the 520-ft. level. It is the plan of the management to carry on extensive development at this horizon.

Wright-Hargreaves

During the month of April the mill on the Wright-Hargreaves mine treated an average of 191 tons of ore daily, or a total of 5,730 tons for the 30-day period. Mill heads continued at normal thereby resulting in a recovery of around $70,000 for the month. This achievement compares with about 180 tons daily in March.

Underground development continues to be favourable, and the amount of ore broken as a reserve in the mine was at least equal to the amount sent to the mill. This favorable state of affairs is steadily adding to the favorable physical position of the enterprise.

Sinking operations are proceeding at a good rate and the 700-ft. level will be reached during the third week in May. This work has become increasingly important owing to the fact that what appears to be an entirely new orebody is lying right against the south wall of the shaft.

Teck-Hughes

During the month of April the Teck Hughes mill treated an average of 162 tons of ore daily during the period when the plant was in operation. The loss of time during the period amounted to five days, due to unavoidable causes, leaving 26 days of operation.

This is the highest average record so far in the history of the Teck-Hughes and indicates that the enlargements recently made are in full operation and giving high efficiency. No statement has been secured with regard to the average grade of the ore for the period, but this may be estimated at approximately $10 per ton, thereby indicating an output at the rate of between $40,000 and $50,000 monthly.

One of the more favorable features in connection with the development program has been the cutting of a new vein at the 730-ft. level, as formerly announced in these columns. A limited amount of drifting has been done and the mineralized body has a width of from six to eight feet. From two to four feet of this is high-grade ore, carrying visible gold and gold tellurides.

Another important feature is that instead of concentrating energy on the work of carrying the winze to the 1,000-ft. level, it has been decided to divide attention between this work and the work of opening up the 605-ft. and the 730-ft. levels. In order to do this, a hoist will be operated at the 500-ft. level. This will be employed in connection with further opening up the 605-ft. level as well as developing the 730-ft. level. Before the end of another week, the cross-cut at the 700-ft. level should reach the downward continuation of the main vein which at the 605-ft. level showed such rich ore. Another hoist is being installed at the 730-ft. level and this will be employed on the work of gradually sinking to the 1000-ft. level. This latter work will not be hurried, and it may be after the end of the current year before levels are established at 855 and 980 feet in depth.

The work now under way at the 730-ft. level is not only opening up a new ore-body, but it will within a few days open up the continuation of the main vein. Should this prove to be as rich as was the case at the 605-ft. level, it will be an exceedingly important development.

Tough-Oakes

The mill on the Tough-Oakes mine is handling about 70 tons of ore daily. During the time occupied in opening up a working level at the 500-ft. level, as well as completing the cross-cut to No. 11 vein, it is not expected that the ore will be of a uniform grade. Good progress is being made, however, and these points should be reached by about the end of May. It is also expected the first clean-up will be made in the mill during the last week in May.

Contracts for mining work on the Montreal-Ontario have been let and this operation is expected to go ahead on an important scale.

FOR SALE

Complete Mine equipment consisting of:—

2 — 60 H.P. Portable Boilers Complete.
1 — Donkey Boiler with Hoist.
1 — Hoist.
1 — 3 Drill Steam Compressor.
1 — 8 x 8 Belt Driven Compressor.
1 — Electric Lighting Outfit complete.
1 — 10 Ton Capacity Holt Tractor.
1 — Leyner Drill Sharpener.
1 — 10 x 16 Farrell Crusher with Screens.
Pumps, Drills, Stoppers, Mining Equipment, etc.
Laboratory outfit with small crusher, glass ware, balances, etc
Above installed only short time and in good condition.

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Advertisements other than "Employment Wanted" or "Employees Wanted" will be inserted in this department at the rate of 20 cents per agate line (14 agate lines make one inch) $2.80 per inch, each insertion, payable in advance. Space measured from rule to rule. When four or more consecutive insertions of the same advertisement are ordered a discount of 25 per cent will be allowed.

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BRITISH COLUMBIA

The Mineral Province of Western Canada

Has produced Minerals valued as follows: Placer Gold, $76,177,403; Lode Gold, $105,557,977; Silver, $55,259,185; Lead, $18,330,575; Copper, $166,393,188; Zinc, $21,818,531; Coal and Coke, $225,409,505; Building Stone, Brick Cement, etc., $34,072,016; Miscellaneous Minerals, $1,210,639; Making its mineral production to the end of 1920 show an

Aggregate Value of $734,259,619

The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years to 1895, inclusive $94,547,241; for five years, 1896 1900, $57,605,967; for five years, 1901-1905, $96,509,968; for five years, 1906-1910, $125,534,474; for five years, 1911 1915, $112,072,603; for the year 1916, $42,290,462; for the year 1917, $37,010,392; for the year 1918, $41,782,474; for the year 1919, $33,296,313; 1920, $35,543,084; 1921, $28,066,-641.

Production During last ten years, $336,562,897

Lode-mining has only been in progress for about twenty-five years, and not 20 per cent. of the Province has been even prospected; 300,000 square miles of unexplored mineral bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than those of any other Province in the Dominion, or any Colony in the British Empire.

Mineral locations are granted to discovers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full information, together with Mining Reports and Maps, may be obtained gratis by addressing.

VICTORIA, British Columbia.
THE HON. THE MINISTER OF MINES,

PROVINCE OF QUEBEC

MINES BRANCH

Department of Colonization, Mines and Fisheries

The chief minerals of the Province of Quebec are Asbestos, Chromite, Copper, Iron, Gold, Molybdenite, Phosphate, Mica, Graphite, Ornamental and Building Stone, Clays, etc.

The Mining Law gives absolute security of Title and is very favourable to the Prospector.

MINERS' CERTIFICATES. First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is $10.00, and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

WORKING CONDITIONS. During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

SIX MONTHS AFTER STAKING. At the expiration of six months from the date of the staking, the prospector, to retain his rights, must take out a mining license.

MINING LICENSE. The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of $10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of $5 an acre for SUPERIOR METALS, and $3 an acre for INFERIOR MINERALS.

The attention of prospectors is specially called to the territory in the North-Western part of the Province of Quebec, north of the height of land, where important mineralized beltsare known to exist.

PROVINCIAL LABORATORY. Special arrangements have been made with POLYTECHNIC SCHOOL of LAVAL UNIVERSITY, 228 ST. DENIS STREET, MONTREAL, for the determination, assays and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. The well equipped laboratories of this institution and its trained chemists ensure results of undoubted integrity and reliability.

The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

HONOURABLE J. E. PERRAULT,
MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC

EDITORIAL

Since by those unchanging laws of geological structure and geographical position which the Creator himself has established, this region must always....remain distinct from Canada on the one hand, and from New England on the other, the name Acadia must live; and I venture to predict that it will yet figure honourably in the history of the world.... Sir William Dawson, 1878.

QUALITY FIRST

"Mass production" is a term coined on this continent, and used to describe a method of manufacture developed in the United States and adopted in Canada. Its adoption has been tried in Europe, but there it has failed of success. Why? Because in Europe *quality* counts for more than it does here.

On this continent we have not yet progressed completely beyond what in the older lands would be called primitive conditions. After all, a considerable part of Canada's population is still composed of pioneers in all walks of life—farmers, manufacturers, lumbermen, prospectors, educationists, and so on. This has certain distinctive influences upon our entire community, one of these influences being our failure to give due regard to the effect of *quality*.

In some cases, "quality" is synonymous with "safety first," as in the construction of motor cars or of railroad rolling-stock. Where a defective steering mechanism or a cracked wheel means death, we do take precautions. Sometimes "quality" spells "success," as in the export of Western wheat or of Nova Scotian apples. The exporters of bacon are now trying hard to induce farmers to breed the proper quality of hog, so that Canada may keep this lucrative trade.

There is a continuous and world-wide movement towards the betterment of the quality of man's handiwork. It is true that, since the time of the wholesale introduction of machinery to aid work done by hand, the products of manufacture have in many cases not equalled the products of the former craftsmen. Still, in other instances mechanical aids have meant products of improved quality. In general, the tendency toward improved quality is continuously in evidence, and never more so than today, when the forces of organized research are brought to bear in its favour.

The mineral industry of Canada has, to an ever increasing degree, a reputation throughout the world for the quality of its products. The products of Trail's electrolytic refineries have, by their quality, won a market in the East in the face of world-wide competition. The talc of Madoc has an exclusive market. The feldspar of Ontario and Quebec has set an unequalled standard of excellence. Nickel and Monel metal are synonyms for fine quality. Cheaply produced cobalt makes possible the use of stellite, "the wonder metal." All foreign miners of asbestos try to equal "Canadian crude." Our manufacture of calcium carbide, synthetic acetic acid, and aluminum are not surpassed, and are on the way to pre-eminence.

But much remains to be done in order to take full advantage of the mineral resources with which our country is endowed, even those that are already discovered. There is being exported from Canada today feldspar whose quality is not excelled on the continent; yet three years ago Canadian feldspar exporters were in disrepute on account of the poor quality of 'spar they were shipping. Loose business organization and worse mining practice had been allowed, and Canada's feldspar trade inevitably suffered. Canada's reputation for good feldspar was traded upon for a temporary gain. Producers of feldspar might now band together to protect Canada's good name—an asset of distinctly tangible value in such a case.

There are now being developed the first deposits of china clay in Canada that give promise of being of first rate importance. Already the superficial parts have yielded an impure clay that has given remarkably fine results for certain uses. A consistent and thorough course of development may here result in providing the prime essential of a profitable pottery industry, based upon good clay and the best of feldspar.

The progress made in Canada's ferrous metallurgy during the war time, principally through the use of the electric furnace, seems to have been lost. This retrogression may be more apparent than real. We may with reason hope that the present rising tide of prosperity will witness the production on a large scale of electric furnace steel, which is now rapidly out stripping its competitors among high grade steels and for which our cheap hydro electric power makes Canada specially adapted.

The openings for the miner and the metallurgist along the line of quality are numerous. Some of the opportunities are obvious to the trained man, whose progress is at present impeded by lack of funds or for some similar reason. Other opportunities lie before men that are not trained sufficiently to see them, and so must await the coming of a man with knowledge and vision. Still other opportunities will come only in the course of time, and they are in endless succession. In any case, we will make no mistake in adopting "quality" as the watchword in our mining and metallurgical endeavours.

THE GOUDREAU GOLD DISTRICT

Today we print an abstract of Dr. Lees' report on the Goudreau gold district, the result of his examination of the area last summer. The Director of the Geological Survey has made available to the public through these pages a report

that would otherwise be delayed until the publication of the annual Summary Report. The Journal wishes to make hearty acknowledgment to Dr Collins for this public service.

There has been a good deal of mining development since Dr. Thomson made his field examination last summer, particularly on the Murphy claims, where the descending shaft has disclosed remarkable gold values in the vein. A private correspondent writes, "I never saw such rich gold ore "as I... is taking out on the Murphy claims. I hope the "property will be given a fair chance." Another correspondent, after spending two weeks in the district, lately, writes, "The Goudreau Gold Mines, Ltd., that is the Mur"phy Mine, have completed the power line from Steep Hill "Falls, and have about eighty men working. They are "sinking two shafts. The No. 1 shaft is down eighty-odd "feet and is showing remarkable values. Every few feet "they run into very high grade ore, very spectacular. The "shaft is going down near a diabase dyke, which I suppose "accounts for the remarkable enrichment in places. Noth"ing else is going on in the district as yet, although some "wild cat companies are already selling, or trying to sell, "stock round Windsor."

The latter correspondent also says that about a thousand "snow shoe" claims have been staked during the winter, and that these are now at least five hundred prospectors and would-be prospectors in the new field. Certainly the Goudreau district is in for a "rush."

Judging from the information at present available, it is reasonable to conclude that the only prospect in the new Goudreau district that now gives promise of making a paying mine is the Murphy. Its similarity to the old Emily Mine to the north-east suggests that there are also possibilities in the latter. Meantime there is nothing in the district at a more advanced stage than a prospect, and a prospect is not yet a mine.

It is only reasonable to suppose that the intensive exploration consequent upon the present "rush" will result in the locating of further gold-bearing veins that will be worth the expenditure of the money necessary to explore and develop them. If the spectacular pockets of ore of the Murphy vein should be accompanied by sufficient ore of lesser, though workable, value to warrant consistent mining and milling operations, and if the Murphy vein should not prove unique in the area, Ontario will have taken another step forward as a gold producer.

A COMING METALLURGICAL CENTRE

The recent outbreak of discussion in the House of Commons at Ottawa on the proposed St. Lawrence Ship Canal was evidently premature, as it received no serious attention. It is a question of first-rate importance to our Dominion, and will no doubt, receive the attention its importance warrants when the time is ripe. Meantime it will be pertinent to point out a feature of the project that has so far received little public consideration—its relation to our mining and metallurgical industries.

It seems probable that both parts of the proposed development will have a marked effect on our mineral industry. To open our inland ports to sea-borne transportation is to make the centre of the continent more nearly an integral part of the great Atlantic market. This will help the mineral industry in some instances, by providing a more profitable outlet for its products, and will hinder it in other cases where cheaper transportation will mean keener competition by materials from without. The power of the St. Lawrence will be an aid in the cheap and effective manufacture of our raw mineral products, and, along with our other great water-powers, is bound to be one of the main factors in determining the character of Canada's industrial development during the next few decades.

Consider the question of iron ore. With the exception of the plants in Nova Scotia, Canada's iron industry is part of the fringe of the mid-continental iron-manufacturing field, dependent for its existence upon the ore of Minnesota and the coal of Pennsylvania, and for its unique prosperity dependent upon the barriers of rapids and falls in the Niagara and St. Lawrence rivers. When these barriers are removed, and the cheaper iron and steel of the Atlantic market are available, there is bound to be some re-adjustment. What it will be is for iron-masters to predict.

The farmers of the West have been the most ardent advocates of the new canal. They want cheaper transportation for their wheat to world markets. Maybe the grain carriers will bring back as ballast Welsh coal to Ontario's ports, in competition with coal from the United States, as is now being done in Nova Scotia and farther down the Atlantic coast.

There are already developed a number of small mineral industries that could branch out into a more extensive export business were cheaper transportation to distant markets available. Talc and feldspar are instances. But it is in the manufacture at home of our raw materials, and the shipment of the more valuable products that the most interesting possibilities lie.

The comparatively cheap electric power available at Niagara has been largely responsible for the growth of the hive of industry within its radius. Not only its direct use in electro-metallurgical manufacture, but its aid to manufacture as motive power, have been of incalculable benefit. But for metallurgical use, Niagara's importance is waning. There is now such a demand from domestic consumers and the users of electricity for motive power that the cost of the residue is almost prohibitive for metallurgical use. True, plenty of off-peak power will be available for a long time; but that will attract only a limited number of consumers with special requirements. Electro-chemists and metallurgists, and others requiring cheap power in large quantities, must look elsewhere.

Canada's share of the power it is proposed to develop on the St. Lawrence will not for a long time to come be required for the use of domestic consumers, as is the case at Niagara. The land adjoining will not support a large agricultural population, and there are plenty of other water-powers to supply outlying communities. Consequently St.

Lawrence power should remain available indefinitely for the purposes of electro-metallurgical and electro chemical manufacture. On this score the St. Lawrence is likely to become one of the world's chief centres of manufacture by means of electric power. It is on the road that the products of half a continent will take on their way to the world's markets. It will be most convenient, as well as profitable, to use cheap hydro-electric power to turn the raw materials into finished products *en route*.

When the time comes for a detailed discussion in Parliament of the St. Lawrence project, it might be well to lay more emphasis than formerly on its effect upon what is now our second industry, and what may, in the years to come, be our most important industry—mining and metallurgy.

EDITORIAL NOTES

Our Nova Scotia correspondent, in reporting the proceedings of the initial sittings of the Scott Conciliation Board, gives the impression of a logic and thoroughness not always characteristic of such proceedings. Up to the present the disputants appear to have been attempting to attain their ends by exaggerating facts, and concealing part of the truth. But the offer of the Company, reported by our correspondent, to open their books privately to the chairman of the Conciliation Board seems now to demonstrate a frankness that is beyond question. The main contention of the miners is that they are not getting their due fraction of the wealth they create. If the Company's books can demonstrate satisfactorily that the stock watering of former days is not now bearing with undue weight upon the miners of today, then the miners cannot logically claim better wages than the Company has offered them.

The hundred days during which air dried peat can be produced in Canada are now at hand. The Joint Peat Committee has ready at Alfred, Ontario, the apparatus it has succeeded in developing during former seasons. It is hoped and expected that this season's demonstration will show conclusively the feasibility of commercially producing peat from our bogs. There is no Waterloo to come at the end of this hundred days; but we hope there will be great rejoicing over the mastering of a problem that has defied solution for so long.

It was stated recently in Parliament that the Yukon Territory is subsidised from the Dominion treasury to the extent of $250 per annum per head of population. This would make it appear that this vast Territory is an unwarranted burden upon the country. But it is hardly so. Most of this expense is for the administration of justice over an area of 150,000 square miles. The expenditure of the comparatively small sum required annually to keep active the public institutions of Dawson and smaller centres is now more than justified by the renewal of mining activity due to the silver finds at Mayo.

In the monograph on "Platinum and Allied Metals" recently published by the Imperial Mineral Resources Bureau, it is suggested that in Canada prospecting for platinum "in situ" might reasonably be expected to result in valuable discoveries. Very little search of such a sort has been made, though there are promising areas readily accessible. Probably the difficulty and expense of the assay for platinum has been a serious deterrent. Our public assay offices might find it expedient to make some concession in favour of a trained searcher for platinum — that is, one whose samples are likely to be worth assaying.

The citizens of the Sydneys, Nova Scotia, have been hard hit by the industrial depression and the consequent closing of the steel works and the reduction of coal mining to small dimensions. Without the coal and steel industries, Sydney harbour would have on its shores only little fishing villages. The citizens are evidently suspicious that the industries upon which they depend for a living are being made the subjects of "high finance" rather than of legitimate industrial operation. At a mass meeting held recently, they asked that the Provincial Government investigate the "overhead" expenses of the constituent companies of the British Empire Steel Corporation, particularly as to their number and their salaries; also the question as to whether the directors are not operating in the interests of "stock-jobbing" rather them in the interests of the shareholders. These ideas are current, not alone in Sydney, and will bear frank explanation and rebuttal by the corporation.

AD AGRICOLAM

Let us go, said the farmer, and talk to our folk,
And get them to help us to throw off the yoke
Of the cities, the banks, and the people who don't
Produce a damned thing, though they might, but
they won't.

And he went, and he went in a kind of a way,
And he found it quite different from getting his hay,
For the touch and the taste of prestige once possessed
Overcame him, and made him a person obsessed.

He forgot that some other hard workers exist,
And that not everybody in town may resist
That he (maybe she) is the only producer,
(You are bound to be cranky, if that's what you do
are).

So we ask in our prayers for a natural thing,
And that's the whole reason my Muse makes me sing:
We ask, and we really can't ask for aught fairer,
That the farmer will treat as an equal the miner.

ANON

Goudreau Gold Area*

By E. Thomson

Gold was discovered in this district in 1918 but was at that time secondary in importance to the pyrite, both because of the smallness of the gold bearing veins and because of the demand for pyrite. It was not until the discovery of the Murphy gold property in Township 28, Range 26 in the Spring of 1921 that this region attained any prominence as a possible gold producer. During the summer of 1921 the district to the east and west of Goudreau was visited by A. G. Burrows of the Ontario Bureau of Mines staff who made a short official report on the more prominent gold properties. **

Location and Topography

The gold bearing area is in the vicinity of the town of Goudreau on the Algoma Central Railway, some 177 miles north of Sault Ste. Marie, Ontario, and about 17 miles south of Franz, the junction point of the Algoma Central Railway with the Canadian Pacific Railway. Gold has been found on both sides of the railroad, the older claims being to the east, the newer claims to the west of the right of way. The more important claims may be reached either by canoe route or by wagon road and are included for the most part in Township 28, Range 26; Township 27, Range 27; Township 26, Range 27, Algoma District.

The contours in this comparatively small area are of the same character as in the rest of that district. Undulating country alternates with marshy ground and the district is studded with lakes and streams. Most of the water to the west of Goudreau drains west into the Magpie River, while the streams and lakes to the east of Goudreau drain to the south and east into the Michipicoten River. The country on both sides of the Algoma Central Railway has been burnt over at least once and in several instances two or three times and only second-growth poplar and birch remain for the most part.

General Geology

The rocks in this district consist for the most part of acid and basic volcanics of the Keewatin formation, but these rocks have intercalated with them small bands of iron formation and are intruded by a boss of granite. All three of these formations are cut by diabase dikes of (probably) Keweenawan age which are so prevalent in this region. The latter have for the most part been intruded subsequent to the deposition of the gold ore, the veins being faulted by them in several places. The geological succession is briefly as follows:

Pleistocene deposits.
Diabase dikes of probable Keweenawan age.
Granite.
Iron formation.
Keewatin volcanics (acid and basic).

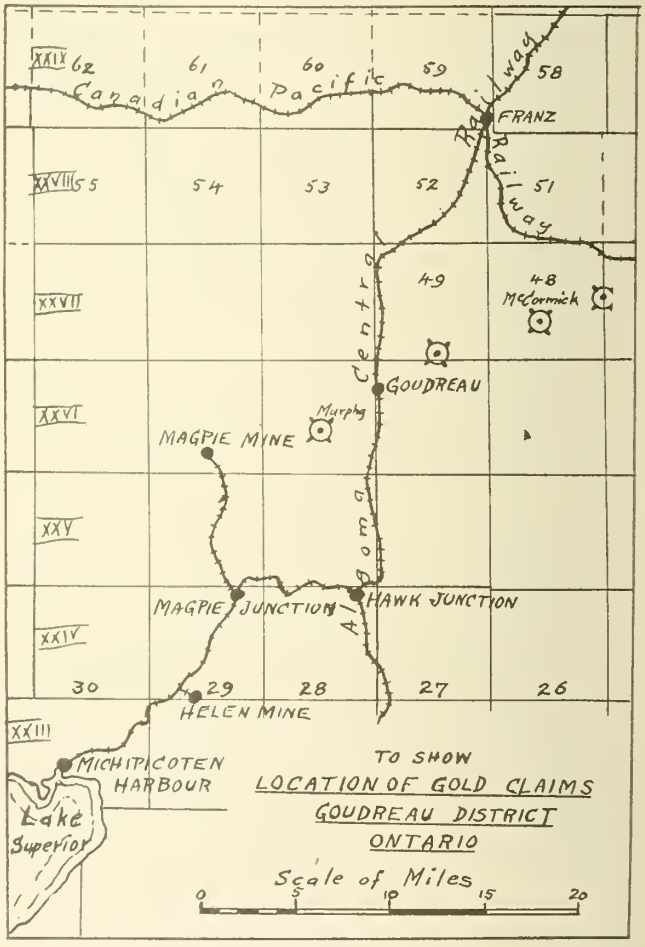
Dr. Collins' report on "The Ore Deposits of Goudreau and Magpie-Hawk Areas in Michipicoten District", (Summary Report, Canadian Geological Survey, 1918, Part E.) deals fully with the rock occurrences of the region. This may be summarized as follows:

Diabase dikes—These are of two varieties, a younger containing olivine, and an older quartz diabase. The gold veins are usually unaffected by the former, but are sometimes faulted by the latter.

Granite—The only granite in the area is a boss in the centre of Township 28, Range 26. Its close proximity to the Murphy gold vein would suggest its connection with the deposition of gold in the vein. The granite is intruded by the diabase dikes, but cuts the Keewatin rocks.

Iron formation—This has been fully described by Dr. Collins. Its main characteristic is the predominance of siderite and pyrite in its composition. The gold values in this formation are found to be due to veins and veinlets of gold bearing quartz that traverse it.

Keewatin Volcanics—These rocks, composing 80 to 90 percent of the rocks of the district, are of two distinct types, acid and basic. To the west of the Algoma Central Railway the basic types predominate, while to the east the acid flows are more common.

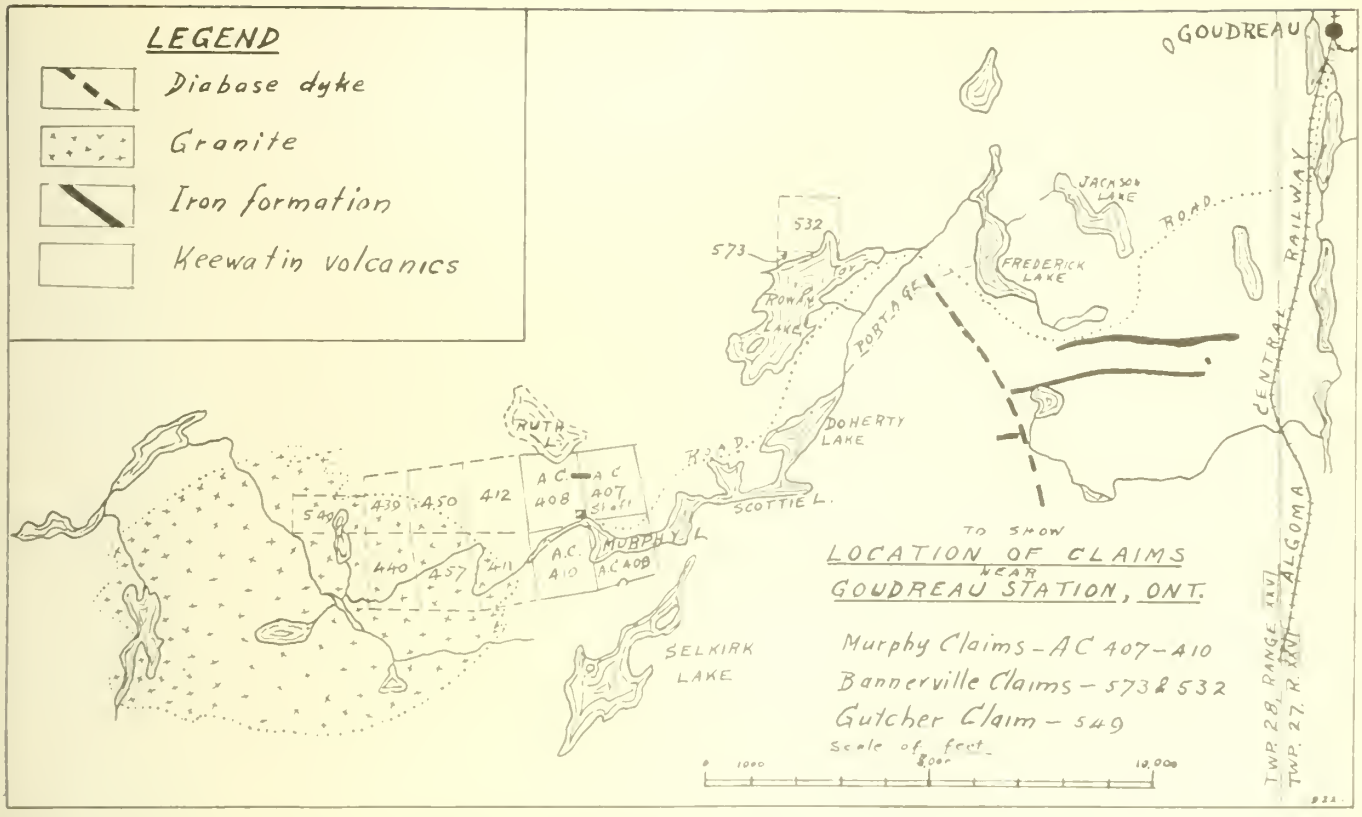


Basic Flows—These are, in the main, younger than the acid flows. They are, for the most part, fine-grained volcanics with the original texture and composition of a basalt but now very highly altered. In the vicinity of veins the rock frequently contains biotite, quartz, muscovite, and occasional needles of tourmaline, as a result of the hydrothermal action to which the veins may be ascribed. In places the usual basaltic character gives way to amygdaloids, vesicular lava and tuff.

Acid flows—These are mainly quartz porphyry and

*Abstract published by permission of the Director, Geological Survey, Ottawa.

** A. G. Burrows, Memorandum on Part of the Goudreau Gold Area, Canadian Mining Journal, Vol. XLII, No. 31, Aug. 5, 1921.



feldspar porphyry, though there is a felsite in which some gold-bearing veins occur.

Economic Geology

There are three distinct types of gold bearing quartz veins in the district. These may be described as follows:

Shear veins—These occur along the planes of schistosity, mostly in the acid volcanic schists, where the greater fissility of the rock seems to induce their presence. They are composed mainly of quartz, with minor amounts of carbonates in places, and characteristically contain tourmaline, which indicates their hydro thermal origin. The shear veins are seldom larger than stringers, and are not often close enough together to make mining profitable.

Cross veins—Veins cutting across the plane of schistosity of the schist have two phases which are described separately. Both are younger than the shear veins. The first variety occur mostly in the acid volcanics and in the iron formation, and contain pyrite and numerous black needles of tourmaline in addition to gold. They vary in width from a few inches to two feet or more. On the McCarthy-Webb property in Township 27, Range 27, they may be seen of a length up to twenty or thirty feet.

On the Gutcher claim (described in detail later) veins of this type cut the granite, and are very irregular in length and width. They are of quartz, and contain pyrite, covellite, chalcopyrite and muscovite, and a little gold.

All veins of this type are too small and irregular to be mined separately, and are not sufficiently close together to provide paying ore.

Fissure veins—Only on the Murphy claims have veins of this type been noticed. The main vein cuts across the strike of both acid and basic volcanic rock. It is cut by a younger diabase dyke and faulted slightly by it, thus marking its age as greater than that of the dyke. The fact that there is a narrow band of carbonate iron formation along the vein for part of its length suggests that the two are of the same age. This vein, too, contains tourmaline.

The fact that the Keewatin rocks of this vicinity are surrounded by a large area of granite, and that a boss of granite protrudes in the centre, suggests that the Keewatin rocks are completely underlain by granite, being merely a comparatively thin covering over it. If this is assumed to be the case, then the flow of solutions through the cracks and fissures of the overlying Keewatin rocks would be a natural consequence of the last stages of cooling of the granite magma. The presence of tourmaline in most of these veins tends to support this theory. That native gold has been found on the Gutcher claim in quartz veins of the pegmatite variety cutting the boss of granite would show that gold bearing solutions were not foreign to the granite body during its period of cooling.

Description of Properties

McCormick—This property, claim S.S.M. 2183, is about in the centre of Township 26, Range 27, east of Pine Lake. A pit nine feet deep has been sunk on a band of iron formation in basic volcanic rock. The iron formation, two and one half to four feet in width and 70 feet long contains pyrrhotite and quartz as well as smaller amounts of chalcopyrite, pyrite, sphalerite and iron carbonate. Gold values in the pit ore sand to vary from $16.60 on the surface to $19.20 at a depth of four feet. No values of consequence have been obtained from other parts of the band of iron formation.

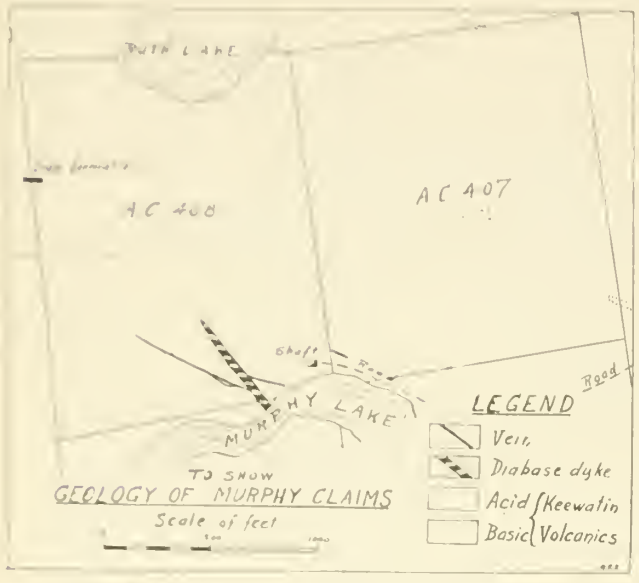
Fuller Block—The gold bearing veins on this property which adjoins the McCormick on the west are a small quartz stringer containing pyrrhotite, pyrite and chalcopyrite in addition to free gold. It occurs at the junction of acid and basic Keewatin volcanic rocks.

Claim—Claim 2181 is north of 2183. Gold values up to $9.00 per ton are said to have been got from a band of sulphide bearing basic volcanic rock at its contact with quartz porphyry.

On claim 2180, adjoining 2181 on the east, [illegible] pits have disclosed shear veins and cross veins containing native gold, all in basic volcanic rocks. All the veins are small to be a commercial value.

Claim 2189 is one claim east and [illegible] the [illegible]. A

pit 25 feet deep has been sunk on some small quartz stringers said to carry values up to $3,400 per ton. They cut both basic and acid volcanic rocks, and are cut by a diabase dike.



(Acid Keewatin rocks within dotted lines.)

Webb—Claim 2470 is in Township 25, Range 27. Discontinuous "shear-veins" occurring in the planes of schistority of basic Keewatin rocks form a band said to extend for 1,700 feet, though only two to three hundred feet of this length was examined. Gold values have been obtained from this band, which is of irregular width.

Webb-McCarthy—Claims 2049 and 2050 are the south boundary of Township 27, Range 26. In acid volcanic rock there is a zone containing numerous "shear-veins" and "cross-veins", from two to sixteen inches in width. Tourmaline, pyrite and a little free gold are visible in the quartz of these veins.

The veins of claim 2051 have already been described in Dr. Collins' report, and no work of consequence has been done since he examined them. They are essentially similar to the veins of the adjoining claims described above.

Banville-Pagé—Claim 532 is on the north shore of Rowan Lake in Township 28, Range 26. Gold has been found in a contorted band of iron formation cut by numerous cross-stringers of quartz. The iron formation, six to ten feet in width consists principally of quartz and iron carbonate, and occurs in basic Keewatin schist. Chalcopyrite and an occasional flake of gold are to be seen in the stringers of quartz.

Gutcher—Claim 549, is in the western part of Township 28, Range 26. The gold-bearing veins, mentioned above, are in the boss of granite that protrudes on this claim, and are evidently of pegmatitic origin. One vein, one to three feet wide and two hundred feet long, shows free gold in places, as well as considerable accounts of pyrite, covellite and muscovite and a little chalcopyrite, malachite and ankerite. In a larger vein, twelve feet wide, no gold values were observed.

Murphy—Approximately in the centre of Township 28, Range 26, are claims 407, 408, 409 and 410. Most of the development work has been done on claim 408, near the north-east shore of Murphy Lake. The vein has been stripped for its entire length, 800 feet, and is from one to ten feet wide. It is composed of quartz, with numerous small needles of tourmaline, chalcopyrite, some bornite, pyrite and sphalerite, and native gold. The strike is from east and west to 205 deg., and the dip is from 60 deg. to the south to vertical. The country rock on both sides is impregnated with quartz and metallic sulphides for a foot or more.

Native gold has been found in numerous places along this vein, and a good "showing" was seen at the bottom of the pit, twenty feet deep at the time of this visit.

The vein on claim 408 is much the most promising in the district, and is the only one where gold values are at all consistent. As it is a "fissure" vein, it holds promise of values at depth.

This report describes only those claims that showed native gold at the time the examination was made. No mention is made of the numerous claims of less promise.

PRODUCTION OF STONE IN 1921.

Estimate by the United States Geological Survey.

About 62,400,000 short tons of stone was quarried in the United States in 1921, according to the United States Geological Survey, Department of the Interior. This is more than 20 per cent less than the production in 1920. The estimated value of this stone is $92,500,000, a decrease of 30 per cent as compared with 1920. The Geological Survey has difficulty in estimating the production so soon after the close of the year, for many producers do not send in their reports promptly. The quarries, too, are widely scattered and depend largely upon local demand. The figures given were obtained by comparing the reports of certain representative companies for 1920 and 1921. The repors compared for building, monumental, paving curbing, flux, and crushed stone represent more than 35 per cent of the total for each product.

Producers all over the country stated that both wages and prices had been reduced, and nearly all reported a decrease in the cost of production. High freight rates are said to have contributed largely to the general depression in the industry.

Building stone was in but little demand, and the returns at hand indicate a decrease in output of about 25 per cent. The output of monumental stone, which has shown practically no diminution during the last five years, apparently decreased more than 45 per cent. Paving blocks were in great demand, and increases were shown in the sales of curbing and flagging, facts that indicate a revival in street work in cities and towns. The campaign begun for the betterment of suburban and country roads caused an increase of nearly 8 per cent in the output of crushed stone. Depression in the metal-smelting industry was reflected in a decrease of more than 50 per cent in stone sold for fluxing and for use as refractory material. Decreases were noted also in the demand for agricultural limestone, and for stone used by alkali works, sugar refineries, paper mills, and in other manufacturing establishments.

The gold production of the United States in 1921 was 2,375,479 ounces, valued at $49,105,500. The annual production from dredging is substantial. From the beginning of the industry, in 1896, to the end of 1919, the total value is reported to be $153,342,048. The gold recovered by 91 dredges in 1919 was worth $10,346,216, and from 93 dredges in 1918 $10,342,100. It is interesting to find that dredges have been operating in the Phillipine Islands; in 1919 gold to the value of $217,455 was thus obtained.

News of Mining

The monazite sand deposits of Ceylon are now receiving considerable attention. Two years ago British operators shipped somewhat over 75 tons of the sand. It was then valued at about $250 per ton. The Department of Mineralogy, Ceylon has officially expressed willingness to assist in erecting plants for the extraction of thorium if a suitable market can be found.

Because Germans are at present not permitted to enter Australia, the erection of a large quantity of German lignite briquetting machinery in Victoria is being indefinitely held up.

In correcting statements made by John Brophy, president of District No. 2, United Mine Workers, Mr. G. Webb Shillingford, president of the Central Coal Association (Pa.), asserted unequivocally that the earnings of all mine employees in Central Pennsylvania for 1921 averaged $1,319.42 for 138 working days, a rate of $9.56 per day, or about $1.20 per hour for an eight-hour day.

Iron ore to the amount of 73,136 tons was exported to Great Britain from Algeria during January and February of this year. This is only half the quantity shipped during the corresponding period of 1921.

Considerable numbers of the Industrial Workers of the World Organization sailed from New York last week for Southern Russia. They propose to operate iron and steel works in the Urals on a Co-operative plan and to manage the enterprises themselves, meanwhile paying tribute to the Soviet Government.

The average price of sheet mica in Canada and the United States during the year 1921 was 16 cents per pound, just half of the average for the preceding year.

The "socialization" of coal mines in Czecho Slovakia has been adversely reported upon by a committe of the National Government. Out of 16 committee members, 10 voted *contra*.

The total number of blast furnaces erected in Great Britain is 486. During the quarter ending March 31st, 1922, only 97 were in blast.

At the annual meeting of the British Aluminium Company, Limited, held in London, Eng., last year's over-production was discussed at length. Two of the company's aluminium plants and one alumina plant have been closed. During the early months of this year production was much curtailed to facilitate the disposal of old stocks. Lower costs and higher prices are confidently expected in the near future.

The British Metal Corporation, Limited, dealers in non-ferrous metals, has entered into an agency agreement with the British America Nickel Corporation and will handle the latter company's products throughout Europe.

The adoption of stainless steel in colliery work is being strongly advocated in Great Britain. In these steels the chromium content runs from 12 to 14.5 per cent. Experiments and experience have greatly enlarged the applicability of these steels. They are now made both in machinable condition and in malleable form for the production of stainless sheet steel.

The Rand Chamber of Mines has donated $100,000 to the relief fund in aid of sufferers from the recent uprising. The Chamber has also signified its willingness to deal with *bona fide* labour and trades organizations. The mining situation is showing rapid improvement. The net result of the strike, so far as the gold mining industry is concerned, will be a pronounced reduction in working costs.

A joint committee of the Midland Institute of Mining, Civil and Mechanical Engineers and the Yorkshire Branch of the National Association of Colliery Managers has published a lengthy memorandum outlining an educational scheme for employees and officials. For employees from 14 to 16 years of age it is recommended that the statutory requirement of 320 hours per year be spread over 16 weeks averaging 7 hours per week (322 hours) distributed somewhat as follows:—

Physical training and health	1 hour
Literature, etc.	2½ hours
Mathematics and Science	2 hours
Handicraft	1½ hours

This arrangement is designed to combine vocational, technical and humanistic studies in a manner that, it is hoped, will prove effective and will not interfere with the day's work. For the training of candidates for official positions several alternatives are suggested, of which the following are most to be commended:

(a) Two years' courses in which full time is given for a complete yearly session of nine months.

(b) A three year course, in which six months each year are spent in full time study, leaving six months free for suitable employment. The second of these two alternatives has been received with most favour. It is calculated that a charge of 0.18 penny in an output of 10,000,000 tons of coal per annum for the county of Yorkshire would cover the cost of training 240 students yearly.

Calculated As at December 31st, 1921, the gold ore reserves of the Modder Deep Mine, the Rand, S. A. are reported as showing 1,357,000 tons, assay value averaging 9.3 dwts. over the whole. This is a slight increase of tonnage over estimates made 12 months before and a drop in value of one-tenth of a penny weight.

As a result of the occupation of German South West Africa the position of the British South African Diamond Syndicate has been greatly strengthened. The Syndicate has recently entered into an agreement with the largest producers, namely, the Premier, South West Africa, De Beers, and Jagersfontein, governing the method of selling. Each company will put only limited quantities on the market. As Russia and the Belgian Congo are the only two outside competitors South African producers now possess a practical monopoly of the world's diamond market and over production is no longer to be feared.

According to the latest comparative tests made in Great Britain to determine the comparative fuel value of coal and oil, it was found that in Yorkshire boilers both fuels were equally efficient, but that the cost of oil was 82 per cent. greater than that of coal. It is stated that the cost of oil will have to be reduced to 50 shillings per ton before it can successfully compete with coal as industrial fuel.

The British Government has made advances of money aggregating £41,250,000 under the Coal Mines (Emergency) Acts of 1920 and 1921. Under these Acts all collieries profits were pooled and the Government controlled the payment of standard profits, making up losses in cases when operations did not warrant the payment of a dividend. The sum of £9,900,000 has so far been returned to the Government; a further sum of £6,000,000 is looked upon as recoverable. The net deficiency, therefore, will be £25,350,000. To this must be added £16,000,000 representing the cost of administering the Coal Mines Control Agreement (Confirmation) Act of 1918, and the cost of wages subvention for three months after last year's coal strike was settled. The aggregate deficit is thus £41,350,000. Of this amount the sum of £13,450,000 was applied in wages. Offsetting this huge deficit is the fact that the limitation of profits largely benefited the inland consumer who received coal over a long period at prices less than the cost of production. Moreover, £25,000,000 accrued to the government between 1914 and 1921 in excess profits duty.

Eleven representative coal mining companies in South Wales earned profits aggregating £1,895,716 for the year 1920. In the following year profits amounted to less than one third of this, £605,517. For the two years, average interests were, respectively, 15.2 per cent and 5.5 per cent.

The total production of petroleum coke in Canada and the United States is 700,000 tons per annum. This is equivalent in weight to about one per cent. of the crude oil refined. After calcining, petroleum coke is ground, mixed with a binder and moulded into shapes suitable for many uses. It is utilized as carbon for arc lights and in the manufacture of electrodes.

The Imperial Oil Company last winter erected at Fort McMurray a 38' x 60' warehouse and will soon complete two storage tanks. Fort McMurray is the most northerly railway point in Alberta and is the centre of oil prospecting activities.

Despite the stagnant condition of the lead trade, more white lead was manufactured and sold in the United States during 1921 than in any previous year. The storage-battery industry, which consumes more lead than any other branch of the market except the manufacture of paint, operated about 60 per cent. of capacity. Normally, cigarette manufactures use 25,000 tons of lead in making foil. In 1921 the demand was 30 per cent. lower than normal.

The Franco-Belgian Coke Oven Corporation, of Brussels, is putting on the market a new type of regenerative coke oven, the Piette. The Piette is of the horizontal type, with vertical flues and transverse regenerators. Thirty-day tests made at St Louis, Mo., have given such satisfactory results that interest has been stimulated very widely amongst coke manufacturers.

Kentucky and Illinois fluorspar producers are now asking $17.50 per ton, f.o.b. mines, for guaranteed 85 per cent. spar, carrying 5 per cent. silica. For unguaranteed 80 per cent. spar, with silica as high as 6 per cent., the price is $16 f.o.b. mines.

The American Zinc, Lead and Smelting Company reports an operating loss of $260,100, for the year 1921. A loss of $338,312 is reported by the Utah Consolidated, whilst the Calumet and Hecla Mining Company shows a loss of $1,491,259.77, and the Old Dominion Copper Company a loss of $1,482,055.71.

The coke oven industry in Great Britain is now recovering in marked degree from the effects of the coal strike. Full recovery depends upon several factors, among the most important being the hoped for reduction in the price of materials, especially that of silica brick.

The Irish Peat Inquiry Committee has arranged for the translation, publication, and distribution of Hansding's "Handbook on the Mining and Utilization of Peat." The industrial exploitation of Irish peat bogs is commanding serious attention.

A newly patented Belgian device for indicating the deviation of diamond-drill bore holes from the vertical is being put on the market. It is composed of a rotating basin mounted in an axle driven by clockwork fixed to the walls of a tube fitted into the borehole in such a manner that the basin will fall on all the changes in the direction of the borehole when the tube is inserted. The basin is made of insulating material with an inserted radius of conducting metal or *vice versa*. The surface of the basin has the curvature of a sphere whose centre is situated at the centre of oscillation of a rocking beam suspended in the tube. The rocking beam carries at its lower part a number of brushes. These brushes, coming in contact with the radius, record exactly the course of the bore hole, records being precisely timed by the known times of oscillation.

In the near future the requirements of publicly owned power stations in Germany will be 12,000,000,000 units of electrical energy. The brown coal of the Cologne district is counted on the supply 1,500,000,000 units; the Central German brown coal area 2,000,000,000 units, the water-power stations of South Germany and Bavaria, 5,000,000,000 units, and the waste heat from large industrial plants, 1,000,000,000 units. Peat, lignite, refuse coal, and small water-powers will supply the balance.

The well of the Imperial Oil Company, Limited, near Fort Norman, is producing 10 barrels of oil per week, according to official reports received at Mounted Police Headquarters, Edmonton. Deeper drilling is planned at this well.

Under the Pittman Act, fixing the price of silver produced in the United States at 99⅝ cents, the Bureau of the Mint has purchased a total of 103,380,308 ounces. The purchases for the week ending April 22, were 103,700 ounces.

News and Comments

by Alexander Gray

Mining Corporation Awaiting Events

Of the mining Corporation of Canada it is to be said that it has been vigorous and vigilant in its policies. It set the pace in seeking desirable new properties, whether in Alaska or Labrador, fully realizing the gay life of Cobalt has its limitations. To conserve its cash, it suspended dividends. Although President Watson told his shareholders at London there is no likelihood of the immediate resumption of distributions, it is complimentary to himself and his colleagues that they continue to be "bullish" on Canada. The corporation was fortunate in acquiring the Buffalo property at the bargain counter. Instead of being almost exhausted, the Buffalo last year accounted for nearly twice as many ounces as the mine was thought to possess at the time of the transfer, and the ore reserves remaining are counted on to yield a further 1,500,000 ounces of silver. That will be of material assistance in bringing forward the Flin Flon property, concerning which Mr. Watson was purposely none too optimistic, but which has very substantial features warranting the expenditure of millions upon development, plant and a railroad. An assured 16,000,000 tons, he said, has a gold content approximately valued at $26,000,000; $13,000,000 in silver, and$111,000,000 in copper. That makes it appear as though the combined precious and copper content average $9.37 gross per ton. The gold content of $1.625, and $0.812 silver, ignoring zinc as a factor other than metallurgical, and the copper value of $6.937 (presumably with copper taken at a normal market price) require the best metallurgical practice.

At any rate the recoverable values as stated, confirm general knowledge. Mr Watson expects the recovery will be from 78 to 80 per cent. of the ore values about $120,000,000. "But do not forget", he admonished his audience, "there is a vast difference" between that spot value in "the Wilderness, in Manitoba, and that same amount of money in the bank on which we can draw cheques and pay dividends". What the profits will be, Mr. Watson did not venture to forecast. There are "ifs" in the case. Unless there is railway transportation and hydro-electric power it is a certainty "it will be some years before a profit can be realized out of the property". Avoiding metallurgical mistakes, developing the area and securing what is needful, means that the Mining Corporation has a potential asset that cannot be prematurely productive and toward which the other mines of the corporation will have to contribute large sums. Until the 90 miles of railway is finished and quicker and cheaper development is possible, the Flin Flon must wait. The locality is undergoing extensive exploitation, other companies are being promoted, the Elbow lake discoveries have added interest; but Mr. Watson truly prepared the scenario and it is for the Manitoba Government to put on the film. Flin Flon quality and quantity are incentive to find more. The Mandy Mine owners had high grade copper and hurdled with enough of it by water and land routes to win a profit.

Undoubtedly the district has great richness," said Mr. Watson, and "the more discoveries made" the sooner, perhaps, "the Government will build a railway".

Dome Mines In Strong Position

Against an issued capital of $4,290,003, after setting aside $476,667 applicable for the return of capital, in accordance with the policy of the Company, Dome Mines of Porcupine wound up its fiscal year with 56.36 per cent. of its capital liabilities ($2,417,930) in liquid assets represented in Government and Provincial Bonds $125,000, Other Bonds, $1,257,313; Call Loans, $625,000, and Cash, $137,717, to which may be added Inventories valued at $272,900. The reservation for plant depreciation and mine exhaustion, and the practically cash assets as stated, leave little to wish for unless it be an understanding that the mining position is comparably strong. Current earnings are the complement of all reasonable requirements and General Manager Depencier is "safety-first" personified. The latest Dome innovation is the payment of 25 cents as a cash rather than a percentage dividend. Redemption of capital is proceeding.

East Kootenay Mining Power Demand.

Team work is giving "pep" to at least a portion of the British Columbia Mining Industry. Combined railway and banking influences are backing the Consolidated Mining & Smelting Company. Mines, money and perfect metallurgy, more milling capacity planned, call for the prompt provision of power "sufficient to produce" all the reduction works are capable of treating, besides what is needed for the general purposes of the Sullivan Mine, where, to quote General Manager Blaylock, "there is an exceedingly large tonnage of ore developed and a very much greater tonnage awaiting development". Equipment is out of line with Sullivan requirements. To remedy this, arrangements will be made with the East Kootenay power company in which Montreal Capital is invested. Nor will unnecessary time be lost in negotiations. Knowing how to do it, and doing it, in British Columbia may cause Northern Ontario to do likewise, where cash customers are clamorous. For that matter British Columbia needs all the activity it can muster, for its mineral production in 1921 amounted to $28,000,611 as against $35,513,081 in 1920. For a grand aggregate tonnage mined in that province last year, of 1,562,651 the value was $12,923,398, to which $23,200 for placer gold may be added without exciting attention.

Another Try For Oil

Having made [illegible] to get [illegible] and to demand [illegible] the conclusion of Senator Clary, Col. Cornwall, W. W. Butler, two or three [illegible] Concrete, and others to make the group international, is making another frontal attack on Great Slave Lake-Athabasca-Hay River country. Geologist O'Neill advised [illegible]. Exploration work of the sort is expensive. Mr. O'Neill's positive statements have been made during three years and his previous [illegible] provided the funds to prove his statements. All of which confirms that Ottawa was penny-wise and pound-foolish in its policy regarding [illegible] before there is oil worth mentioning. Nothing [illegible] our Company activities to be curtailed. The [illegible] going to find oil, if it is to be found, in great quantity.

Canada's Copper Deposits

In calling attention to Canada's copper mines and copper potentialities, the Imperial Mineral Resources Bureau reaffirms what repeatedly has been urged by *The Canadian Mining Journal*. It is not so all important that the domestic consumption of copper "has hitherto been about 20,000 tons per annum, or less than half the production of British Columbia alone," as it is to have a progressive policy by which importations of copper and copper products will at least be minimized. American capital has been accounting for, and is still accounting for, practically all of the copper produced in British Columbia. The presence of this capital is welcomed and more of it is desirable. A more complete performance within Canada is, however, a perfectly natural ambition, now the Trail, Port Colborne and Nickelton refineries are capable of any and all demands upon them. Imports of copper in various forms are so many deductions. Brass, too, can be home made.

It is true the Consolidated Mining and Smelting Company have gone slowly about the development of their own copper properties and that the Canada Copper Company suspended operations owing to the metal market and high freights; but the comment of the Imperial Resources Bureau does not coincide with that of those who maintain that Canada's copper rating cannot compare with other countries. Possibly Montana, Arizona, Utah, Nevada, Chile and Peru are distinctive as assured sources of the red metal. Alaska, too, is contributory. Anyox was brought along when it was thought Granby was in the throes. Howe Sound areas are not despicable. Once upon a time Swansea was the refining center. New Jersey superseded it. In the opinion of the Imperial Mineral Resources Bureau, "Canada possesses very important and well-developed copper deposits and a great number of smaller mines and 'prospects' widely scattered over the Dominion from the Yukon to Nova Scotia. Canada is remarkable, among copper producing countries, for its immense deposits of copper-nickel ore in Ontario.... Canadian copper-ore deposits are of the most varied description, some carrying copper glance, others containing gold, some gold and silver, and others various base metals, particularly silver-lead and zinc."

Momentum is what is needed.

Copper Outlook Slowly Improving

Probably because they cannot get quick market action (the rapid turnover that represents brokerage) those of the Curb environment find no virtues in the copper industry. They profess apprehension over the modified resumption of operations. Production of 75,000,000 to 100,000,000 pounds each month from mid-summer on makes them pessimistic, and they point out that the "Copper Combine" (meaning the Copper Export Association) was not very confident or else it would not have dropped the price of the metal to 12 1-4c. 12 1-2c. Besides, one Curb pamphleteer lodges this "oh-be-doleful" complaint against those who have copper production in hand:

> "Heavy sales last month (April), estimated in the press at 150,000,000 pounds, were, as usual, only of the 'paper' variety. Actual movement into consumption was only fractionally of this large magnitude. Transfers of metal from refineries to warehouses of selling agencies should not be interpreted as real sales. This explains how practically all the copper companies which have reported upon 1921 operations have 'disposed' of their unsold supplies".

Why renewed activity at copper properties should give Curb solons conniptions is no mystery. They have other uses for popular funds. They would have the public believe juggling with metal supplies is going on, that the red metal masters are sleight-of-hand performers who are planning discomfort and increasing their own agonies by increasing production! Instead of doing anything of this sort, though, Mr. Stephen Birch, speaking for the Kinnecott and other of the largest copper corporations, asserts that the industry is proceeding in an orderly manner toward better metal markets and consequent prosperity. No runaway markets are anticipated. Instead of the market being 12 1-4—12 1-2 cents, as the Curb authority averred, Mr. Birch, than whom there is no better authority declares "copper is being sold to-day at 13 cents and many of the large producers are entirely sold out. The outlook for the copper industry is favorable and the surplus of copper on hand has been reduced from 390,000 tons a year ago, to 230,000 tons to-day." Undoubtedly the bulk of the surplus is held by the Copper Export Association. Significantly enough, too, Germany is the largest buyer of copper—and is paying cash for it. Everything depends upon resumption of operations and the ability to sell the product. There is no need of the charge of subterfuge emanating form the Curb.

Chance of a Life Time

The retiring disposition responsible for the advertisement of a "Gold Mining Opportunity," without divulging his name, imparts the information that $25,000 cash will secure one-third interest in a "real" good mine upon which $75,000 has already been spent. It is further represented that favorable reports have been made by a galaxy of eminent engineers, among them "Dr. J. Austen Bancroft, Asst. Gen. Manager Consolidated Mining and Smelting Company, of Canada." As Dr. Bancroft never was Assistant General Manager of the Consolidated Mining and Smelting Company, and as his report upon this anonymous property was not a thing to enthuse over, the "come on" advertisement will hardly accomplish its purpose. The property is "free and clear" of everything, (including enough ore to justify the terms used), and there is the added assurance that an operating company will be organized—and a market made, no doubt. In directing attention to this advertising habit of whispering promoters, the intention is to prevent the abuse of the reports of reputable scientists, who regard the property as a *prospect* of some merit. A year or two ago (in this connection) newspapers of two continents displayed specious advertising about Labrador having the Mother Lode of Canada, one offshoot being near the Transcontinental Railway in Quebec. London sat up and took notice. An alert mining engineer visited Quebec and inspected this "real" gold mine; but he was very impolite about it and told his escort there wasn't a ton of ore actually blocked out. He did not say the ground was not worth a try. It was the undeveloped condition and the location that caused him to be blunt as a bludgeon. So why not be frank and above-board instead of using the names of professional men in an unwarranted way?

From the Rainbow's Tip

No one would care much whether the Southern Alberta moisture will insure this year's crop, or the professional rainmaker absents himself, if a small part of the reports from Lethbridge are verified. In the West Butte Sweet Grass Hills, it is wired, gold and platinum-bearing ore has been found. "Three lots of samples sent to Montreal show: Class 1.—Gold, $493; Class 2.—$250; Class 3.—Gold $83. Platinum averaged 1 1-2 per cent." Negotiations have been opened with London. Money is sought for development. Why it is sought—and why a ton or two of platinum and gold ought not to be extracted without further ado, is for London to ascertain. The platinum content is a trifle too low for the credulous, and rather high for the incredulous. A happier mean might have induced Montreal to bite off a bit of the platinum or iridium, or

whatever it is, if for no other reason than to determine whether the gold content as stated is worth while, as a by-product. Montreal seems to have been kept in the dark about the analyses, until the secret leaked out in Lethbridge. And yet there might be more in that Butte than there is in a lot of Sweet Grass oil country. Oil and platinum by the pound are the sum of sublime content. Or has another Grimm been born?

Conroversy Over Canada's Horoscope

Campbell of Cassidy and Corless of Coniston have locked horns over Canada's mineral resources, their extent, diversity and relative magnitude as among the nations. They are at variance in their view of Canada's horoscope in the matter of minerals, Mr.Campbell being the aggressor in the negative end of the argument. Mr. Corless had no idea he was arousing his fellow-member of the Institute of Mining and Metallurgy when he wired to Prime Minister King that "ninety per cent. of Canada contains inconceivable wealth in minerals." Mr. Cambell caustically retorts that Mr. Corless indulged in "extravagance" of statement, was intemperate, when he said that.

Furthermore, Mr. Corless is charged with having made a mis-statement. Proceeding to contest the issue (which is incapable of general solution until a few decades have elapsed and more work is done), Mr. Campbell is combative. The outcome of the discussion will be as momentous as the ultimate decision whether Quiller-Couch is correct in assuming that a total abstainer is incapable of lofty flights in literature, or whether George Bernard Shaw is justified in claiming the privilege of ascertaining "how much he had when he said it"—meaning that Quiller Couch must offer more than idle assertion.

To begin with, Mr. Campbell was rather couchant when he opined that Canadian mineral resources do not or cannot conform to the utmost of our national aspirations. He deprecated false hopes. According to his view Canada knows the best and the worst. Controverting this Mr. Corless voiced the conviction of many that the pre-Cambrian areas of Canada have only begun to assert their economic worth. Mr. Campbell does not see it—prefers to have it blocked out—will not concede it is here. Mr. Corless did not intend to have the "inconceivable wealth" he divined taken too literally. Rather it is believed he has enough confidence in the geological ages represented to presume that history as established elsewhere will be repeated hereabouts.

The futility of extreme optimism or pessimism need not be emphasized. Mr. Corless is the more admirable of the contestants in that he is in favor of an intensive programme. Urging the exploitation of Canadian mineralized areas, and having the courage of his convictions, Mr. Corless did not infer that every quarter-section of "ninety per cent." of Canada "contains inconceivable wealth in minerals." An "average crop" will suffice. Phenomenal yields usually are localized. Rhodes, with that optimism which Mr. Corless displays, was photographed in the act of addressing his Chartered Company shareholders and telling them "Rhodesia is mineralized from end to end." He erred on the side of optimism; but that is the way to create diversions.

"Fling your heart across first; the rest will follow," said von Valkenhayn to the youthful Crown Prince of Germany, in whom he was cultivating intrepidity. Mr. Corless is heartening; Mr. Campbell would be disheartening; to go out, stick a hole anywhere, and in nine cases out of ten tap untold wealth." Not at all. The earth is not so prolific as all that. Nor have the borrowings and sorrowings for and about "frantic railway expansion" the slightest application. Mr. Campbell, like Lot's wife, is perverse. The fact that our mineral production barely pays our coal bill, is a structural defect that will be rectified in due course. Being overbuilt with railroads is burdensome; but this was the experience of the United States and every other country where opportunity beckoned to governments and private capital. Mr. Campbell is too well informed not to be aware that nearly every western railway in the United States went through receiverships. Again and again there was default. Europe financed the United States. It was the mineral developments that gave speculative impetus to the Rocky Mountain and Pacific States; it was the overflow from California and Nevada that started things in British Columbia, Alaska and the Yukon.

The return upon capital, all things considered, has been ample. Canada's economic scales cannot be balanced by "watchful waiting." Had unintentional reactionaries held sway, progress would have been deferred. Even Anyox was condemned. So was the Sullivan Mine. The Nickel fields provided more agonies than profits. Quebec Asbestos underwent discredit. There is utter disregard of the wealth contained in the Wabana iron deposits and Maritime coals. If the bill for imported coals is excessive, it is for Canada to reduce it.

"The optimist is always right," declared Sir Percy Fitzpatrick when a member of the mining firm of Wernher, Beit, Eckstein. That affirmation undoubtedly was an exaggeration; but sporting spirit is what makes the world move.

NOTES FROM THE FIELD

By R. E. HORE

Holtyrex

A Smith and Traverse diamond drill outfit has arrived at the Holtyrex property. Some of the crew have recently returned from Mexico where the drilling company did some work. Mr W. Young and Mr Smith will visit the Holtyrex and make arrangements for the drilling campaign.

La Rose O'Brien

The judgment in the LaRose O'Brien dispute is arousing much comment. By this judgment La Rose apparently loses ground that was not in dispute in the early stages of the fight. The Violet shaft becomes the property of the O'Brien and La Rose will be required to compensate for ore extracted. It is a serious blow for La Rose company.

Gold Mining Active

At Porcupine and Kirkland Lake there is now unusual activity. The producing mines are doing better than ever and there is a revival in prospecting and exploration. It is freely predicted that this will be a very busy year in all the gold areas.

Silver Mining Brighter

While activity in the silver areas is overshadowed by gold mining this year, there is a noticeable improvement in the silver areas also. The McKinley Darragh Savage is resuming operations. The price of silver has advanced far enough to arouse hopes that others now idle will soon be in action again.

Sudbury has Good Views

At Sudbury there are rumors that some smelting and refining will be under way in International Nickel plants before long. There is considerable ore on hand and mining operations will not necessarily be resumed for some time. But to have a smelter unit in action and some smoke will improve spirits at Sudbury.

Book Reviews

PLATINUM AND ALLIED METALS (1913—1919). Imperial Mineral Resources Bureau, 1922. His Majesty's Stationery Office, London, S.W.1. pp. 2s. net.

This volume gives a good resumé of the occurrence and production of these precious metals within the British Empire, and summarizes the occurrences elsewhere. A bibliography is appended.

The world's production of platinum comes principally from placers, the small residue being mainly attributed to the nickel ores of Sudbury. To date, about 11,000,000 troy ounces of platinum have been produced, 90 per cent. of it from Russia, 7 per cent. from Columbia, 2 per cent. from Borneo and the remaining 1 per cent. equally from the United States, Australia and Canada.

Areas of dunite in the central Ural Mountains are the source from which the streams of the district have gathered the precious metal. The platinum is associated in the rock with chromite, but never in sufficient quantity to be profitably mined.

The alluvial deposits in Columbia that are worked for platinum have evidently got their supply of the metal from conglomerate beds of Tertiary age, composed of boulders of basic rocks, originally of Jurassic and Triassic age.

The platinum of the Borneo placers is associated with gold and diamonds, and has its origin in areas of olivine-gabbro and metamorphosed sediments in the uplands.

Platinum is of wide-spread occurrence throughout Canada, but at present is recovered principally from the nickel ores of Sudbury. The association of platinum with chromite has been noted in Quebec, Ontario and British Columbia. It is suggested that as the chromite-bearing rocks have never been properly examined for platinum, such a search might well repay the prospector.

Osmiridium, next in commercial importance to platinum in the group, is produced mainly in Tasmania. It also is associated with serpentine rocks. Placers rich in the alloy are so extensive that Tasmania seems assured of a virtual monopoly of its production for some time to come.

MODERN TUNNELING. By David J. Brunton and John A. Davis, with new chapters on Railroad Tunneling by J. Vipond Davies. — Second Edition, revised and enlarged. — Published by John Wiley and Sons, Inc., New York.

No technical treatise is modern if it is ten years old. Some such volumes, but not many, may survive because of their intrinsic historical value. The majority are relegated to the "dump."

The first edition of Modern Tunneling, we remember very well. Its distinguished senior author, Mr. David W. Brunton, is a man who has given a wonderful impetus to sound mining and professional literature, and has done more than his bit in simplifying and improving mining practice. His co-adjutor, Mr. John A. Davis, is a worthy associate of a genuinely great United States citizen and engineer. Mr. John Vipond Davies' contributions to this well-ordered volume attest his fitness for the task.

It is not seemly to bestow unqualified encomiums upon any printed product. It is the reviewer's opinion that far too much space has been allotted to the bibliographical lists that form integral parts of the volume. These lists might easily and profitably have been condensed in small type as an appendix, or else have been omitted entirely. So much for fault-finding.

What is particularly noticeable about the book is the clear cut, logical method of treatment. The theme is developed in an introductory chapter with a crisp sketch of the history of tunneling. (Editor's note—The differentiated spelling of the last preceding word is a matter of taste, not of accuracy.) The succeeding chapters deal in due sequence (as indicated by their captions) with "Modern mining and water tunnels," "Choice of power for tunnel work," "Air compressors." "Ventilation," "Incidental surface equipment," "Rock-drilling machines," "Haulage," "Incidental underground equipment," "Drilling methods," "Blasting," "Methods of mucking," "Timbering," "Safety," and "Cost of tunnel-work.". In this edition (as noted above) there is added a comprehensive review of railroad (railway) tunnelling practice.

It will be seen that the scope of "Modern Tunneling" is wide. It may be stated, without reserve, that every phase of this highly important branch of mining and civil engineering is dealt with in an adequate manner. The reviewer must not paint lilies. Suffice it to say that this is a good book, written (not compiled) by men that love their work.

Because the reviewer is certain that further editions of the volume will be demanded by an appreciative circle of readers, he takes the liberty of suggesting that the full-page illustration opposite page 16, entitled "**Fig. 3. Starting a tunnel by hand-drilling,**" be excised. Something serious, he fears, is going to happen to the man holding the starter.—C.

PERSONALS

Mr. Chas. Camsell, Deputy Minister of Mines, and Prof. Stafford Kirkpatrick of Ottawa are among those honored by Queen's University last week.

Mr. C. M. Teasdale died at Flin Flon, Manitoba, on April 22. He surveyed a large number of mining claims in the west, particularly in the Pas district, and was interested in several claims there. At Cobalt in 1906 he was in charge of parties doing survey work for the Bureau of Mines. His family reside in Toronto. In his college days he was Varsity's mile runner.

Mr. Robert Bryce has returned to Toronto after examining properties at Kirkland Lake.

Mr. G. C. Bateman returns to Cobalt this week after a trip to California.

Mr. W. M. Hotchkiss is now residing at Cobalt again.

Mr. C. H. Hitchcock of Sudbury is in California.

Mr. Harry Kee is at Porcupine in charge of operations on the Goldale property.

TASHOTA CLAIMS UNDER OPTION

The Hull Rivett-Goad-Kipper Claims, six in number, lying 2 1-2 miles east of Tashota station, Canadian Government Railways, north of Lake Superior, have been taken under option by the Coniagas management. The price is $150,000. All papers have been signed, sealed, and delivered, and work will begin at once.

I visited this camp some years ago and after my inspection felt assured that these claims would sooner or later be tried out by one of the big companies. The whole district is most promising, but unfortunately the immense amount of drift makes rock exposures few and far between, and anything like close detailed prospecting is as yet impossible.

Tellurides are found in some of the veins, carrying, as is usual, a high percentage of gold. — *Charles A. Bramble.*

Notes From Nova Scotia

The Conciliation Board

All the eyes of Nova Scotia are focused on what is now known as the "Scott" Conciliation Board which is sitting in Sydney and the adjacent mining districts.

The board is composed of D'Arcy Scott, Ottawa, chairman, J. E. Moore, St.John, N.B. representing the Dominion Coal Company and Isaac D. McDougall, Inverness, representing the miners.

The board spent a strenuous week and went into three collieries to see conditions underground. This entailed much labor to the members; but the workmen wanted it and the board was anxious to gratify their wishes. Suffice it to say that one visit was all that was necessary, as after seeing the interior workings of one mine all evidence submitted to the Board afterwards was thoroughly understood. The miners seemed to take what I would designate a cruel delight in seeing men wholly unaccustomed to mine travelling follow them down into the far recesses of the different collieries. The board members showed themselves equal to the occasion, although they no doubt suffered from the unwonted toil.

Peculiar interest was taken in the work of the board owing to the fact that it is the second board to sit on the same case and to look into the long drawn out agitation that raged round the collieries after the Gillen Award had been rejected.

There is much conjecture as to what the new Award will be and what may happen should it prove unfavorable. While not expressing any opinion we can keep our minds easy as to the future while awaiting the verdict. Of one thing we are sure, and that is the work of the present board is so thorough, no other board need come after.

Examining the Colliery Villages

The board convened in Sydney Court House and after getting its bearings immediately adjourned to visit the collieries. This was the unexpected, and Secretary McLachlin was caught napping, and to use a sporting term, caught out. In his speeches and through the Labor Herald, the irrepressible and irresponsible J. B. had boasted that he would have an imposing array of new exhibits in the form of hungry women and rag-clad children. Whether or not the chairman had heard of this motley army there was no time given to marshal it. The direct action of the board in going out to see the miner in his home was too much for the disgusted McLachlin, who refused to go round with them and impart the information so necessary to men unfamiliar with colliery conditions. This was attended to by other more courteous union leaders. In the colliery villages the houses were entered and the size, number of rooms, etc., were ascertained. Questions were freely asked and just as freely answered.

Here and there were groups of happy, hearty, fairly well clad children playing in the streets just as boys and girls have always played and as we are told by the "exiled seer of lonely Patmos Isle," they will play in the streets of the New Jerusalem. No emaciation from malnutrition due to low wages was seen either here or any other place.

Meantime the miners, who are quick to see things, smiled at the adroitness of the chairman who had out generaled their fighting leader, and seemingly decided that they must be careful in their conduct at the sittings of the Board. Now and again they broke out in applause, but it was most interesting to watch the painful expression on their faces when the chairman in his own quiet way designated their hero worship as noise.

The Chairman's Opening Pronouncement

The Statement of the Board delivered by Mr. Scott in his own quiet, dignified manner had a wonderfully soothing effect in the whole Island, and tended to create an atmosphere of peace which remained undisturbed to the end. Part of his statement is as follows:

"We realise what the decision of this Board means to the miners and to the whole of Canada. The situation is a difficult one and unfortunately has been advertised largely one way or the other. We come here with open minds and free from partiality. It is the wish of the Hon. Mr. Murdock, Minister of Labor, that this Board shall visit every locality affected, and hear whatever evidence there is to be submitted. We will hear any one who has something to offer pertinent to the question. We are anxious to see every locality affected and will be glad to go into the mines.

"The mining industry is not unlike a number of other industries which have been affected by the war and the after-the-war conditions. Let us take the dairy industry in which I am vitally interested," said Mr. Scott, "New Zealand butter is being imported into Canada and sold at a lower price than it can be produced by the Canadian farmer. Trade conditions must be considered in all questions, and while the eastern farmer has been affected by lower prices, so also has the western farmer, who today receives a price several times lower than he secured for his product a few years ago.

"I don't make these remarks to discourage the men who are interested in the welfare of the miners," said Chairman Scott, "I simply point them out as analagous situations which show the change of conditions in recent years. I am in full sympathy with labor and especially the workingman who has a large family, and I desire to see that the living wage paid the working man is as large as it is possible to give. Certainly we must consider market conditions when dealing with these questions. Just as the Canadian farmer must meet competition in butter and wheat, so also must the coal companies meet competition from the United States coal mines. I believe if all the coal mines in Nova Scotia were closed the only effect in the Montreal coal market would be an increase of a few cents per ton in the price of coal, and this increase would only remain for a short time at that.

"The coal industry is not in any way a monopoly. I have had some experience in dealing with railway labor, which is considerable of a monopoly. Railway labor is in a better position to dictate the rate of wages, because freight rates go up or down to meet the cost of operation and the railways must always be operated.

"Our investigation will be as general and broad as we can make it looking over the entire situation. We want to see labor get its just and fair return. The sittings will be carried on with decorum and let there be no time wasted.

"It will be futile and useless to stage unnecessary demonstrations with the end in view of pandering to a jury. That will have no effect on my colleagues and myself, who are acting more in the capacity of judges."

D. H. Macdougall Presents Company's Case

At the opening session of the second day, D. H. Macdougall, 1st Vice-President of the Steel Corporation presented a lengthy statement on behalf of the Company. He dealt with the coal trade as it now is, with wages before and during the war, with the merger, with housing con-

ditions and various other matters affecting present industrial conditions.

Mr Macdougall stated that the volume of business had dropped off and there was keen competition for what was left of it by American and British coal. The three main markets were the railways, the bunker trade and the Montreal trade. Ships from all over the world may be classed in the bunker trade, but with the lowering of British prices vessels were now bunkering on other the side of the water for the round trip. The bunker trade has completely collapsed so far as Nova Scotia was concerned.

United States companies cutting pulp wood in Canada were importing Virginia coal at a cost lower than it could be purchased at the pit mouth in Nova Scotia. Virginia coal had been brought into Montreal and English coal was being brought to Canada as ballast.

A Wage Basis and Cost Sheets.

Mr Macdougall said the wages the Coal Company were able to pay to their Employees must always be based on the willingness of the consumer to pay the selling price. He claimed the coal trade in Nova Scotia had dropped off at an enormous rate due to industrial depression while the consumption of coal at the steel plants was nil. Foreign coal was sold in Nova Scotia, while no shipments of coal were made to the United States.

Mr. Macdougall said that a rate of $2.85 per day with steady work assured was better than a high rate and only intermittent employment. The average wage in 1914 was $2.46. In 1921 it was $5.73.

Surface labor had received an increase of 140 per cent. underground labor 145 per cent. and coal miners 136 per cent. He claimed that the mine workers under the adjusted Gillen Award were better off by from 30 to 35 per cent., now than they were in 1914. The rate was 78 per cent higher than the 1914 rate while the cost of living was only 47 per cent higher today than in 1914.

The rent of workmen's houses were $6 and $8 per month and employees received house coal for $2.25 per ton. No change in these had been made during the war.

The cost sheets would be submitted to the board but, said Mr. MacDougall, it would be unfair to ask these cost sheets to be given to the public.

Merger Critics Answered.

Answering the criticism with regard to the alleged "water" in the Besco capitalisation, Mr. Macdougall declared that neither upon the ordinary shares of the company nor upon the shares exchanged therefore—that is the second preference and ordinary shares of Besco—nor upon this additional stock of $19,500,000 have any dividends been paid for over a year past; and there does not appear under existing conditions to be any immediate prospect of payment of dividends.

As bearing upon the returns to the shareholders it is desired to point out, said the Besco Vice-President, that shortly prior to the consolidation in 1921 additional capital to the amount $3,500,000 was put into the Dominion Companies by British financiers upon which they have had also had to forego any return for the past year.

Mr. Macdougall went on to say that the profits of the Company were invested in improvements to the collieries and the plants. These profits, accumulated until the time of the merger, amounted to $25,858,749.64.

After referring to the Award of the Gillen board; which placed the minimum rate at $2.85 per day, and a subsequent offer by the company of $3.00 per day, Mr. Macdougall said the company was influenced in accepting the $3.00 rate because of an ardent desire to bring about an amicable settlement of the wage dispute as at that time there was an opportunity afforded of securing contracts but that opportunity has now passed.

A short statement of the Miners will be given next week, also the resultat evidence of the Coal Company. The wages earned will be startling to the public.

Accidents in 1921.

The Mines Report of Nova Scotia for 1921, shows an increase of three fatal accidents over that of last year. The deaths from falls of stone and coal numbered fifteen, from mine cars or trips in motion, eight; from mine gas, two, and from other classes, four.

Falls of stone and of coal have always been the cause of most deaths in our coal mines in spite of all the precautions taken against such accidents. Moving trips or mine cars make a close second. It is the belief of most men that many of these accidents can be averted, but while men persist in evading the Mines Regulation Act, by riding on loaded trips for the purpose of getting out of the mine a little quicker or refraining to place proper supports where needed, the death toll will continue to be large. There is however, the unavoidable accident which neither experience, good judgment or keen observation can prevent.

Twenty-nine men were fatally injured in the coal mines of Nova Scotia in 1921. The number per 1,000 men employed was 2.36 against 2.30 in 1920. Per million tons of coal 5.39 were killed against 4.81 last year.

The statistics of the American mines have not come to hand, but a comparison with 1920 is favorable to Nova Scotia, being 2.36 against 2.91 United States.

Compared by Counties, Cape Breton is far in the lead of all others, with the Glace Bay district down to 1.37 per thousand men employed.

Compared with the mines of Britain, Belgium, and France, the Nova Scotia accident rate is still high, as these countries average well under one per thousand. There is no doubt that old countries, with a professional mining class, have a great advantage over those comparatively new, that have to make miners from all classes of labor as the industry develops.

In output per man killed, the American mines lead all others. This is largely due to thick coal seams and the easy working conditions of most of these.

In Canada as in the United States, great efforts are being made to make coal mining safe, and considering the cosmopolitan makeup of the mining classes, the complexity of mining by the introduction of much machinery underground, and the rapid development of the industry during the past twenty years there is no cause for discouragement.

Great Britain has granted exploring rights in Palestine to the Standard Oil Company. As Palestine is British mandatory territory, this action places United States nationals on an equality with the national Governments that were signatories to the Versailles Treaty. The United States, if will be remembered, was not a signatory.

The gold production of Australia has been steadily declining for many years. Last year the production was 759,297 ounces, against 948,672 ounces for 1920, and 2,720,902 ounces in 1911. The cost of production in Australia is now so high that the gold mines still in operation virtually make their profit from the existing premium on gold.

British Columbia Letter

The Northern Districts

It is stated that the Granby Mining and Smelting Company is contemplating the installation at Anyox this summer, of a new hydro-electric plant involving a substantial expenditure. The idea is to entirely eliminate the necessity for steam-generated power in the operation of the Company's plant. As a preliminary step, the water storage dam, to which reference already has been made, is under construction. The contract for this work has been given a Vancouver firm, known as Dredging and Contracting, Ltd.

The Big Missouri Mine, Salmon River Valley, Portland Canal Mining Division, is to be developed this summer. Messrs. Trites, Woods and Wilson, who are identified with the Premier Mining Company, are reported to have taken a working bond on this property. They are said to be satisfied that the Big Missouri can be made to produce and to pay dividends on the investment required to bring it to the status of a shipping mine.

A syndicate known as the Dunwell Mines Ltd., has been formed to take over and to develop the Dunwell and Stewart Mines in the Glacier Creek section of the Portland Canal Mining Division. These properties are within 5 miles of the town of Stewart. Considerable work was done on the Stewart in early days, including the driving of two thousand feet of tunnels. There are three leads in width from 6 to 24 feet. Ore values run from $25 a ton, although some fine values of native silver were found from time to time. No work was done on the Dunwell, other than 300 feet of surface stripping on the main lead, which is 67 feet wide. The new Company has a capitalization of $350,000.

It is reported that D. C. Jackling, Bart. Thane and G. T. Jackson have acquired an interest in the Fish Creek Mining Company. If this is so, important development is anticipated on the property of this company, which is situated in the Salmon River Section near the Alaska Boundary, during the forthcoming season.

The Daly Alaska Mining Company has been organized under the laws of the State of Washington, to take over, develop and operate, the New Alaska Group of mineral claims, which is situated on the Alaskan side of the line, 11 miles from tidewater at Hyder. It is tapped by the Salmon River wagonroad, so that there are no transportation difficulties. Pat Daly, well known northern B. C. operator, believes that the New Alaska is destined to become an important producer. Last year's work is said to have shown up a large lead of good milling ore, running $85 a ton in all values.

The Cedar Creek Placers.

In the Annual Report of the Minister of Mines just issued, is published a statement by L. A. Dodd, Gold Commissioner at Barkerville, concerning the Cedar Creek gold field. It should be remembered, however, that Mr. Dodd visited the district in the fall of 1921, and that there may have been important changes in conditions since that time. His observations, however, are of interest, in view of the developments of the past few months.

Mr. Dodd examined the pits there, two in number, about 50 feet long, 4 to 5 feet wide, and less than 3 feet in depth. From then up to the time of his departure, some 60 ozs. of gold had been recovered. He continues: "Shortly above the second pit from the Creek the ground takes a sharp rise, and so far no trace of the run of gold has been found in it, although a great number of holes have been sunk in all the draws of the neighborhood.

"An effort to drain some of the deeper ground made by the owners of the back location is being carried on. In digging the drain some fine gold was found, until the ground began to get over 6 feet deep, after which no traces of gold have been discovered. This drain starts in the Lynes and Platt (original discoverers) ground.

"All the ground is very heavily covered by second-growth timber, and one could only get around by following paths, cut by prospectors and along the location lines. I followed the location lines back a distance of over 6,600 feet from the Creek, much farther than where any work had been done. It would appear to me that the overburden with the exception of a short portion of the Lynes and Platt locations runs all the way from 25 to 75 feet deep, which means that the ground cannot be worked advantageously, except by hydraulicking. Lynes and Platt have been using the seepage water for rockers. This is sufficient for this purpose for a short part of the season only, there being practically no water when the weather is dry.

"Lynes and Platt informed me that they had been looking for the discovery since May last. Mr. Lynes, who is a native of the district, had been informed by an old-timer that gold existed, but not where they found it, which was some distance above the old Cedar Creek workings. They do not consider they have made wages during the time they have been engaged in the area.

"The nearest stream of water which might be used for hydraulicking is Rapid River, which would necessitate a ditch line some 12 to 15 miles in length. It would appear to me that there might also be a possibility that the ground might be dredged provided the seepage water could be utilized and is found in sufficient quantities to float a dredger, there being a large muskeg off to one side, from which Cedar Creek flows."

Ore receipts at the Trail Smelter of the Consolidated Mining and Smelting Co. for the week from April 8th to 14th inclusive, totalled 8,089 tons. Of this 7,927 tons came from Company Mines. There was a contribution of 78 tons from No. 1 Mine, Ainsworth District; and 84 tons from the Silversmith Mines, Sandon.

Arrangements are being made for an International Mining Convention to be held at Nelson, B. C., from the 3rd to the 7th of July next. In this connection, a representative collection of provincial ores is being assembled for display.

George Clothier, resident mining engineer for the Portland Canal District, recently paid a short visit to Victoria prior to commencing his active work in the mining sections of the Salmon and Bear Rivers. He looks forward to much development this season and is anxious to have considerable road and trail work undertaken. The extent of the latter, it is understand, depends entirely upon the funds available. These are known to be rather short as the government, in com-

mon with corporations and individuals, is finding it necessary to economize wherever possible.

Portland Canal District.

The Marmot River region of Portland Canal is reported to be due for a notable advance this year, mining men interested claiming that someof the properties under development are likely to make showings rivaling the Premier and other of the Salmon River claims. The Patricia Group is to be opened up on a considerable scale and there are many other promising prospects. Owners are hoping that transporation facilities will be improved.

It is announced that the Premier Mine shipped up to about the end of April from the first of the year 23,700 tons of ore During the last two weeks of April 1600 tons were sent to the smelters at Anyox B. C. and Tacoma, Wn.

A. G. Thompson, general manager of the Kitselas Mountain Copper Company Ltd., Usk B. C. has returned from Portland, Ore. and reports that arrangements have been made for the continuance of tunnel and other work on the property. J. D Galloway, resident mining engineer, referring to this Company's operations in 1921 says that developement of No. 2 vein (blind vein) exposed in the crosscut tunnel was resumed. "This vein", he continues, "had been developed by a winze a few feet deep and this winze was deepened to 30 feet. The vein improved in size and values with this work, there being five feet of pretty well mineralized quartz at the bottom. Average samples by the management are said to show it to be a satisfactory grade of ore. As working in this winze was expensive and troublesome owing to a considerable stream of water, it was decided to run a lower crosscut tunnel so as to cut this vein at a point below the bottom of the winze. This crosscut will be about 400 feet long to strike the vein and will give a depth of 80 feet below the top of the winze. The crosscut was started on Augnst 1 and the work is being continued steadily." This, apparently, is the work to which Mr. Thompson refers, which will be carried on this year.

Slocan

The Oro and Gold Reef Claims, Lemon Creek, Slocan District, are to be opened up this year. A small Ross Mill is to be installed and operated by George A. Hird and W. Munro, of Vancouver.

Cariboo Placers

The Cariboo Exploration Company's placer leases, situated above the junction of the Swift and Cotton rivers, on the Quesnel-Barkerville road, are to be prospected this summer. H. C. Foster, of the Foster Engineering Co. Fernie B. C. has arranged to have the ground drilled and plant has been ordered for the purpose. The ground was obtained on a $100,000 option from James Harrison and comprises some four and a half miles along the Swift River.

The rush to the Cedar Creek section of the Cariboo con-tinues. Work, however, still is impeded by the snow. In a few weeks the season will be in full swing after which it will not be long before authentic reports are received regarding the riches of the claims staked and the probabilities of further discoveries. Whatever the developements, all are agreed that the flurry of interest and the resulting inflow of men intent on prospecting the country must have a good effect. It will likely lead to the finding of other good paying claims because there is gold in all the placers of the Cariboo, the only difficulty in recent years being to find it concentrated in areas of such compass as to make it worth the while to work. Another result should be thedirecting of attention to the hydraulicking and dredging possibilities. There is every reason to believe that many leases that have been held without development now will find the capital needed for the acquirement of the plant required for their exploitation.

An interesting recent development at Cedar Creek is the staking of the Lynes and Platt original claim by Frank McQueen,of Vancouver, under the Mineral Act. The former are holding under the Placer Act. This entitles them to all placer gold in the ground. It does not, however, give them what gold there may be in place. Mr. McQueen has a theory that the gold being found comes but a short distance and that, with stripping of the surface and the exposing of bedrock, gold will be discovered in place. This is his object in staking under the Mineral Act and his action has led many holders of placer claims in thevicinity to secure mineral as well as placer rights.

Surf Inlet Mine

The Annual report of the Belmont Surf Inlet Mines, Ltd., operating the Surf Inlet Mine on Princess Royal Island has been issued and is of much interest. Up to the end of 1921 the Company had been paying 10 per cent. dividend, but last year its net profit was only 10, 509.08. increased to $80,568.25 by the difference in exchange and miscellaneous income. It cost $ 622,222.09 to earn $632,220.09.

Some concern is manifested because at the low figure at which the reserves are placed, but it is stated authoritatively that this is a conservative estimate and that development to be undertaken this year will place a very different complexion upon the situation.

Trail Ore Receipts

A record tonnage of ore was received at the Trail Smelter Canadian Consolidated Mining and Smelting Co., for the four months ending on April 30th last, the total being 150,493 tons. Last year's figure for the first quarter was 139,857 tons,so that there has been a substantial improvement. Receipts for the last week of April were 9,173 tons of which 8,992 tons were from the property of the Company. Among the independent shippers were: The Black Rock, Northport, Washington; the Ottawa, Slocan City; the Republic. Washington; the Silversmith, Sandon; and the Wind Pass Chu Chua.

The coal strike in the Crow's Nest Field already is having its effect on mining in the British Columbia interior. Anticipating that there will be a shortage of fuel, the Consolidated Mining and Smelting Co. is curtailing its operations at Rossland, as the ore from these mines requires more coke in its reduction than does the ore from the Sullivan mine. Some of the men being released at Rossland are going to the Sullivan, and others to the smelter.

Dolly Varden Properties in Dispute.

The Consolidated gold interests of Cripple Creek, Colorado, are taking legal proceedings which may lead to the foreclosure of the Dolly Varden, silver mine, the Wolf Group of Mineral Claims adjoining the mine and the Dolly Varden Railroad, all of which are situated in the Kitsault Valley, Alice Arm, B. C. George Wingfield, of the Consolidated, who claims to have a $200,000 interest in the property, has brought suit to recover on his security. Paul C. Chiene, receiver for the creditors of the Dolly Varden Mines Co., and the Dolly Varden Company, has been added as a party to the action, which primarily is against the Taylor Engineering Co.

Northern Ontario Letter

THE GOLD MINES

Power House Flooded

High water on the Mattagami River flooded the power house at Wawaitin Falls and caused a temporary curtailment of power. This lasted only a few days and the situation has now adjusted itself. Meanwhile, the enlarged storage basin caused by the big dam at Kenogamessee has been completely filled and this, it is believed by the power company, will assure to all the mines their full power requirements throughout the dry summer months.

McIntyre Ore Reserves

In view of continued favorable developments on levels previously opened up, as well as good results at depths down to 1,875 feet, it has been learned on good authority that the McIntyre-Porcupine will show a substantial increase in ore reserves at the end of the company's fiscal year ending June 30. Not only will the report show a greater production than every before in a single year, but is believed likely to show close to two dollars in new ore to each dollar produced for the period.

Newray

At the annual meeting of the Newray Company which will be held on May 16, certain offers for 1,600,000 treasury shares will be considered. It has been intimated that the Coniagas Mines of Cobalt have shown some interest in the proposition, while it has long been known that the McIntyre-Porcupine is seriously interested. There is known to be an encouraging amount of low-grade ore on the Newray, while it is also true that some patches of high grade occur.

Dome's April Record

During the month of April, according to official advice to your correspondent, the Dome Mines established a record that is far in excess of any previous achievement in the company's history. A feature of the record is that while the mill treated an average of 912 tons of ore daily, the average grade of the ore was over $14 per ton and resulted in a recovery of $13.76 from each ton treated.

Tonnage treated in April	27,354
Gold produced	$377,438

Perhaps the outstanding feature of this achievement is that with costs of not much over $4 per ton, the net profit amounted to about $9 per ton, or approximately $250,000 in net profit for the month.

Another feature is that the April production was at the rate of $4,529,256 a year, or close to one hundred per cent. of the issued capital of $4,766,000.

It is significant that net profits should reach $250,000 for a single month, or at the rate of $3,000,000 a year. This is at the rate of approximately 63 per cent. of the company's issued capital, a net profit at the rate of $6.30 a share annually.

Official figures for the four months ended April 30th, show a gross yield of close to $1,300,000. It is to be noted particularly that the Dome is now treating the highest grade gold ore of any mine in Canada, with the exception of the Lake Shore at Kirkland Lake. The difference is that the Lake Shore is treating 70 tons daily while the Dome is treating between 900 and 1000 tons daily. It is this fact that has brought the Dome to a prominent position among the world's great gold mines.

New Shaft for Larder Lake District

Contracts for 300 or 400 feeet of sinking have been let by the Crown Reserve Mining Company. This work is to be done on the company's property in the Pancake Lake section of the Larder Lake district.

The property has been equipped with a first class mining plant, and the management is hopeful of establishing a paying gold-mining enterprise. The exploration work is being carried on by use of diamond drills, and the core of one of the holes showed especially promising gold values.

Progress on V. N. T.

Following the de-watering of the workings on the Porcupine V. N. T. Mines, the checking up of the values has been going on. At one point, assays of upwards of $28 per ton occur across a width of four feet.

It has been reported that in addition to continuing the main shaft to a depth of 900 feet, with lateral work at the present depth of 600 feet and with working levels at 750 and 900 feet deep, it has been arranged to carry on exploration work with a diamond drill. In this way, the several hundred of feet of territory lying between the present main ore body and the boundary of the adjoining Hollinger Consolidated can be explored. It is an importan fact that this intervening territory has never been explored underground although at surface there are a number of outcrops in which visible gold was found during the course of surface exploration.

Lebel Crystal Lake

Surface work on the Lebel Crystal Lake property has recently been attended with promising results. Red and grey porphyry has been found to occur in a big dike on that part of the property lying along the boundary between Lebel and Gauthier townships. Iron pyrite mineralization is heavy, and the dike is understood to carry encouraging gold values.

The Kirkland Lake Road

Some uncertainty still exists with regard to the Ontario Government continuing work this year in the easterly extension of the Kirkland Lake highway. This road is macadamized through the producing section of the district, a distance of about five or six miles. An additional four miles or more of a stretch has been graded. Property owners are now asking that the road be continued another half dozen miles so as to connect up with that part of the old road from Dane station to the Argonaut mine at Beaverhouse Lake. It is understood the Argonaut stands willing to lend its assistance in the work.

A plan is now under way to petition the government for this additional assistance.

In the meantime, the promoters of the proposed light railway project are courting the Drury cabinet. Influential men at Kirkland Lake have expressed the opinion that this is only a "harmless flutation" on the part of Premier Drury, while those interested in the project are seriously of the opinion that the Government may be induced to guarantee bonds to the extent of $15,000 a mile.

The macadam road is a real success, and the leading operators favor this method of transportation.

100 New Houses for Timmins

Arrangements have been made by the Hollinger Consolidated Gold Mines to erect another 100 houses this summer in the town of Timmins. These houses

will be similar to the 150 erected last year.

Housing accommodation in Timmins is taxed to the limit. With the enlargement of the Hollinger mill to upwards of 7,000 tons daily capacity as compared with under 4,000 tons at present, the company will employ an additional 1,000 men, making a total force of about 3,000 as compared with 2,000 at present.

Montreal—Ontario

The Montreal-Ontario, which is the name of the merged Ontario-Kirkland and Montreal-Kirkland, is letting contracts for considerable underground work, and a general scheme is being mapped out. Horace Young is in charge of the operation, and the next few months are expected to witness a working out of the mining problems that were the cause of disappointment under the former management. The adoption of a mining method that will prevent dilution of the ore with the loose waste rock that lies adjacent to the ore, is expected to result in this enterprise being placed upon a substantial producing basis in a reasonably short time.

Cobalt District

According to preliminary estimates, the silver mines of the Cobalt and surrounding districts produced approximately 750,000 ounces of silver during the month of April, the valuation of the output being approximately $510,000.

The price of silver continued strong throughout the month, this strength continuing right up to the time of writing. Mine operators point to the war conditions in China as reason for believing that a further increase may be reasonable to expect.

In view of the McKinley-Darragh having resumed operations, the production of silver from the Cobalt field will be increased by approximately 8 to 10 per cent. beginning with thee month of June.

Silver production during April at the Nipissing mine was a little below normal, according to the regular monthly report issued to the president and directors by Hugh Park, manager.

Re-financing of Maidens Mine

The Maidens Silver Mining Company, Ltd., has arranged a new plan of financing and is to be re-incorporated into the Canadian Lorrain Silver Mines, with an authorized capital of $2,000,000 made up of 2,000,000 shares of the par value of $1 each. The agreement was entered into December 1st and was ratified on January 21st. Application was made and the new charter received on April 18th.

According to this agreemennt, the authorized capital of the new company will be disposed of as follows:—

To the bondholders	484,000 shares.
To shareholders of old company	375,000 shares.
For reorganization purposes	141,000 shares.

After these allotments are made, the treasury will contain 1,000,000 shares with which it is planned to finance aggressive operations. It is stated that about 60,000 treasury shares are being disposed of as a means of raising money with which to pay the expenses of dewatering the mine and having an engineer's report made.

A pooling agreement has been entered into and this is calculated to protect the market during the period in which financing will be done.

High-grade Ore from Castle-Trethewey

In view of the success achieved during recent weeks on the property of the Castle-Trethewey, a substantial shipment of high-grade ore is assured in due course. Already a considerable quantity has been bagged, in addition to which a large amount of medium-grade ore has been put in sight.

Activity in South Lorrain

Judging from the number of Miners' Licenses being issued to prospectors and mining men who are interested in the South Lorrain district, it would appear as though this old area is to enjoy a general revival of activity this year.

This renewed interest is entirely due to the outstanding success achieved on the Keeley Silver Mines as well as the encouragement being met with on the Haileybury Frontier property.

Another Change in Mining Act

Quite a stir has been caused among prospectors by the latest amendment to the Ontario Mining Act, whereby the working conditions will automatically be changed back to a total of 240 days' work on each mining claim.

It will be recalled that one of the first acts of the present Minister of Mines was to reduce the work to 200 days, and to allow twelve months in which to perform the first instalment

Advertisements other than "Employment Wanted" or "Employees Wanted" will be inserted in this department at the rate of 20 cents per agate line (14 agate lines make one inch). $2.80 per inch, each insertion, payable in advance. Space measured from rule to rule. When four or more consecutive insertions of the same advertisement are ordered a discount of 25 per cent. will be allowed.

Advertisements of "Wanted Employment" or "Wanted word, net. Cash must accompany order. If box number is used, enclose ten cents extra for postage in forwarding replies. Minimum charge 50 cents.

Employees" will be inserted at the rate of two cents a

FOR SALE — 40 H.P. Locomotive type boiler, 18 H.P. Vertical, 95%, new, bargain price. 66 Ottawa Street, Montreal.

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Complete Mine equipment consisting of:—
2 — 60 H.P. Portable Boilers Complete,
1 — Donkey Boiler with Hoist,
1 — Hoist.
1 — 3 Drill Steam Compressor.
1 — 8 x 8 Belt Driven Compressor.
1 — Electric Lighting Outfit complete.
1 — 10 Ton Capacity Holt Tractor.
1 — Leyner Drill Sharpener.
1 — 10 x 16 Farrell Crusher with Screens.
Pumps, Drills, Stoppers, Mining Equipment, etc.
Laboratory outfit with small crusher, glass ware, balances, etc
Above installed only short time and in good condition.
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EDITORIAL

It is my firm conviction that Canada's future greatness will depend more upon her mineral production than upon any other of her natural resources.—*A. E. Barlow*—1913.

MINING ACTIVITY INCREASING

Led by the activity in gold mining, there is now a noticeable and general improvement throughout Canada in the metal mining industry. The producing gold mines are not only making larger outputs, but have greatly improved their resources on development. There is now commencing a period of unprecedented activity in the making of new gold mines in Ontario. There is also evidence of an improvement in the conditions of silver mining. The present price of silver, higher than for some time past, and the lower cost of labour and supplies, present an opportunity for profitable mining that did not exist last year. At Sudbury there are reports of some smelting to be done this summer by the International Nickel Company, though it will probably be some time before the smelting of ore at present broken and available will warrant the resumption of mining operations.

From British Columbia there are reports that Anyox and Britannia will be the scenes of much activity this year. The Granby company is now operating at a profit once more, after a period where the high cost of production and the low selling price of copper resulted in a deficit. The Britannia company has a 2,500,000 ton mill under construction. The Premier mine is being operated in a highly successful way, and has already paid $900,000 in dividends this year. Lead and zinc production at Trail have been very large, as well as moderately profitable in spite of low prices. The zinc resources and production of the Sullivan mine now dominate the Western market; in fact, it has been said that the only real trouble now with the Sullivan ore is that there is too much of it!

In the East, the British Empire Steel Corporation, which dominates, and indeed almost comprises, the coal and iron trade of the Maritime provinces, reports a fairly successful year, in spite of the most adverse conditions.

Facts such as these, in conjunction with the reported increase of activity in the mining and metallurgical centres of the United States, augur well for the progress of Canada's metal industry during the remainder of this year.

CANADIAN FREIGHT RATES

On the sixth day of July, a few short weeks from today, the much discussed Crowsnest Pass Agreement, suspended during the last year of the War, becomes effective once again—that is, the Agreement, being a statutory enactment, must be dealt with as such; it must be retained as it stands on the Statute Book, or abrogated. The only other alternative is temporary suspension, a makeshift piece of evasion.

The Agreement has been threshed out most pneumatically in the House of Commons. Some sense, and infinite non-sense, have characterized the debate. Incidentally, the puerilities that mark the interchange of exacerbities between the Premier and the Leader of the Opposition are creditable to neither. They do not make pleasant reading in Hansard.

The Crowsnest Pass Agreement was entered into by the Government of the Dominion of Canada and the Canadian Pacific Railway in 1897. The purpose of the Agreement was to bind the Railway to make reductions in freight rates for certain specific classes of merchandise in return for subsidies granted by the Government. Reductions were to apply on these specific classes of merchandise, whether in "carloads or otherwise," when shipped from any point east or west of Fort William, by rail, or by lake and rail. Thirteen classes of merchandise were enumerated, chiefly covering shipments of fresh fruit, agricultural implements, paints, household furniture, manufactured iron, glass, live stock, etc. At the same time a substantial lessening of rates on flour and wheat was agreed upon. The consideration, in the form of subsidies granted to the Canadian Pacific Railway, was something more than four million dollars, or about $11,000 per mile towards the construction and completion of its Crowsnest Pass subsidiary.

As an extraordinary war measure, this Agreement was suspended by Order in Council on July 27th, 1918, along with all other rate limiting agreements. The suspension lapses on July 6th, 1922.

To secure a just perspective we must contrast, very briefly indeed, the situation as it was a quarter of a century ago with that of today. When the Agreement was signed the Canadian Pacific was operating 7,400 miles of track, as compared with 11,000 miles at the present time. The subsidies mentioned above were designed to aid in opening up mineral lands and to have the effect of lessening freight rates until the volume of traffic should have increased to a point where such lessened rates would be profitable to the railway. At that time the shipment of fruit from West to East had not begun. Nor was the coal trade then much more than a hope. The value of the territory to be opened up, and the profit to the railway therefrom, were alike matters of pure speculation.

The scope of the Agreement was ill defined. No understanding was arrived at as to whether it would or would not apply over all subsequent extensions of the Canadian Pacific. This is a matter yet to be decided. At best, the Agreement was a slip-shod attempt at freight-rate control.

It would be unprofitable to recite the numerous arguments for and against the further suspension of the agreement on July 6th. The central points of the whole situation are apparent. They are these:

The Canadian Pacific has vast reserves of physical assets and cash. It is a well managed, dividend paying institution.

The Government Railways are in desperate plight. They are not well managed, neither are they dividend paying. Yearly and daily they are piling up deficits.

The Board of Railway Commissions has no legal authority to deal with the Agreement.

Western members of Parliament are clamorous for renewal of the Agreement and for lower freight rates generally.

The Railway Managements claim that their earnings will stand no reduction.

Now, it does not seem to us to be meeting the question fairly at all, to urge, as do certain Parliamentarians, that the Canadian Pacific should be bled to ease the situation temporarily. Such a course would make Canada a laughing-stock. Nor is the gradual reduction of rates a remedy to be recommended; much less in any radical reduction. The problem can be summed up in a few words:—How can our freight earnings be increased? From what source can new freight be derived in sufficient volume to justify a recession in rates?

The solution of the question demands statesmanlike qualities in those whom the nation charges with the task of solving it. Those of our representatives at Ottawa who have sufficient ability to form opinions based on the experience of other countries, will perceive the impossibility of making our railways pay and, therefore, the impracticability of freight-rate reductions, before such time as our mineral industries have so advanced as to contribute at least twice as much to the freight traffic as they do at present.

The more attention Ottawa pays to the mining industry, the sooner will our railway deficits be replaced by surpluses.

THE EMPIRE'S MINERALS

In the world's production of mineral wealth, the British Empire bulks large; and in the Empire's total, Canada takes second place only to the mother-land, whose output of coal will keep her long in the lead. Apart from coal and iron, Canada's mineral production is the most important item of the Empire's total; and this item is increasing with such rapidity, and holds so much promise for the future, that many eyes are now being turned toward the hills and mountains of our country, many of them rich with hidden store of wealth.

Hitherto, little attention, either official or private, has been given in Britain to the mineral wealth of the Empire's largest Dominion. This is no longer the case. The upheaval of war resulted, among other advances, in the formation of the Imperial Mineral Resources Bureau. Such an institution was decided on at the Imperial Conference of 1917, when it was clearly seen that the various anomalies of mineral production throughout thte Empire not only hindered the successful prosecution of the war, but prevented profitable economic development during times of peace. In 1919 the Imperial Mineral Resources Bureau received its Royal Charter, as an Imperial body, independent of direct Governmental control. Since that time, the work of its twelve governors, its 150 special correspondents and its hundreds of temporary members, specially co-opted for specific purposes, has already had remarkable results.

The Bureau's methods are characteristic of British thoroughness. Each mineral of importance is considered by a special committee, who gather the material available from the most reliable sources throughout the Empire. A memorandum is prepared, and a copy sent to each member of the committee concerned; then, at a general meeting, it is gone through, word by word, and finally published, after a process of preparation that ensures not only its authenticity, but also its coherence and balance.

Canada's representative in the Imperial Mineral Resources Bureau is Dr. W. G. Miller, Ontario's Provincial Geologist. Canada has no son more worthy to represent her in this Imperial gathering. Always known as a scientist of wide outlook and penetrating judgment, Dr. Miller will represent Canada fairly and judicially in the little grey volumes that are now circulating throughout the world.

That Canada's representative in this Bureau is a sound optimist, is well illustrated in the three reports reviewed today on another page. It is such peeps into the future that fire the imaginations of prospector, investor and operator, and inspire them with the energy and the courage necessary to find and develop the ore-deposits that will one day show that Canada is the Empire's chief treasure-house of mineral wealth.

EDITORIAL NOTES

A view of the railway stations in Northern Ontario is a good indication of the activity in prospecting to be expected throughout the Northland during the present season. The men of canoe and pack are now on the water-routes in larger numbers than for some years past, and will soon be lost to sight in the fastnesses of their respective fields. Gold is what most of them are after. Even while snow covered the rocks, hundreds of claims have been staked. The work that really counts for progress has just now commenced. There is ample promise that this year's activities will see the delimited gold-bearing areas extended far from the original discoveries.

As a foretast of his final report, the description in the *Engineering and Mining Journal-Press,* by Mr. Cyril W. Knight, of the Ontario Department of Mines, of the silver deposits of Cobalt, is extremely interesting. His is a welcome prediction, that profitable silver mining will continue in the famous camp for many years to come. His work of the past two years, to be continued during the present season, has mainly in view the aiding of profitable mining by means of a careful and comprehensive geological study

The Council of the Institution of Mining and Metallurgy, London, England, preserves strict control of the professional conduct of members of the Institution. Cases of unprofessional procedure are investigated and summarily dealt with. Lately the Council placed itself on record, in unequivocal language, respecting the moral and professional obligations of the engineer to his employer. The Council's pronouncement is positive and unqualified. Strong emphasis is put upon "the necessity of recognizing "that an employer has the right to be consulted before "any information relating to his affairs is made public." This obligation does *not* depend upon any contract that "may have been entered into between an engineer and an "employer, or whether it has terminated or not." To this the *Canadian Mining Journal* fully subscribes.

A very earnest and equally vocal United States Senator whose name (it is not easy to believe!) is "Dial, passionately denounces any and all liberties taken with Standard time. The Senator is from the sunny South. Lord Byron wrote of the effect of hot climate on temperament. Senator Dial lends point to Bryon's verse. He condemns utterly those who dare meddle with the measurement of time as ordained by the Almighty." Three cheers for the Senator! Let no scoffer arise and recommend treatment by "dialysis" for the Senatorial thought processes.

Another crusader against the evils of modernity is that dear old biological sport, Mr. Williams J. Bryan. With the perseverance of all the departed saints, Mr. Bryan is fighting the growth of evolutionary thought. Indeed, almost did he succeed in having the teaching of evolutionary principles expunged from the curricula of the State schools of Kentucky. Some sons of Belial accuse the ebullient editor of the 'Commonwealth' of playing to the gallery. Tut! Tut! Mr. Bryan is a sincere *devolutionist!*

The new plant for the concentration and sintering of lean magnetic iron ore at Babbitt, Minn., will begin to produce in quantity during May. It is considered now that the problem that remains to be solved is a system of mining that will give a minimum of cost. So far as the mill is concerned, everything that comes up goes through the whole process without any handling, no selection or cobbing, just a steady stream of earth's crust passing in at one end, and coming out at the other in two streams, sintered ore and tailings. It sounds rather like the oft-pictured ideal sausage machine, where the animal walks in at one end, and comes out at the other end in sausage rases—but with the sausage machine there are no tailings!

MINING VOLUMES FOR SALE

The following volumes, left by the late Professor J. C. Gwillim, of Queen's University, and now the property of Mrs. Gwillim, are for sale.

Those interested in any of these volumes are invited to correspond with Prof. G. J. MacKay, Queen's University, Kingston, Ontario.

Mineral Industry—Vols. I. to X. (Vols. I., VI., VIII., and IX. are absolutely out of print.)

Canadian Mining Journal—Vol. 25 (1907) to Vol. 35 (1914).

Journal of the Federated Canadian Mining Institute—Vol. 2 (1897) and Vol. 3 (1898).

Journal and Transactions of the Canadian Mining Institute—Vol. 3 (1900) to Vol. 22 (1919). Summer Excursion (1908). One volume. General Index and Summary of Papers. Vols. I. to X. One volume.

Transactions of the American Institute of Mining Engineers—Vols. 31 (1901) to 42 (1911).

Note.—All the above are well bound and in good condition (except Transactions C. M. I. Vol. 11, which is paper covered).

The output of the Rand strike was very disastrous upon gold production. January's production was only 875,000 and that of February nearly 77,000 ounces. The total for the March quarter is expected to be in the neighborhood of normal output—less than one-half the usual output. Normal figures are expected until July. A recent estimate of production for April is [illegible] per day for 'Kaffirs' and [illegible] per day for 'Randfontein' [illegible] subject of course to any industrial changes.

The British Ministry of Labour reports that, between the first of the year and the end of March, [illegible] wage rates have brought about a reduction in weekly wages of £1,250,000 according to the [illegible] works, and an increase of £5,100, affecting 21,000 employees.

THE PROSPECT

[illegible]

ANON

Geology and Mineral Resources of Rice Lake and Oiseau River Areas, Manitoba

Under the above title, Part C, 1921, of the Summary Report of the Geological Survey of Canada has just been issued. In it Dr. H. C. Cooke gives the evidence collected during his examination of the two areas during last summer and during the subsequent work in the laboratory. The 35 pages of text and diagram are a model of close and consistent geological reasoning, and deserve more space than can be given them here, where the pointed and lucid conclusions of economic importance must be given more notice. Geological maps of both areas, on a scale of approximately a mile to an inch, are included.

An addition to the Survey's reports that will prove most acceptable to the average reader is the word-picture of the geologic history of the district, given as a summary on pages 34 and 35. This is as vivid as a lucid writer can make it, and, coming after the detailed evidence of the report, is most convincing. It pictures the outpouring in primordial times of successive flows of igneous materials to form beds of volcanic rocks such as basalt and tuff. Submergence, either regional or local, resulted in the deposition of sediments, all these rocks belonging to the Rice Lake series. Then came folding, and the intrusion of batholiths of granite, followed by a period of faulting and the formation of schisted zones. A second intrusion followed, this time of basic dykes and sills. Within the sills there was differentiation by gravity, and deposits of nickel-bearing sulphides gathered on the lower, basic side. Further faulting and folding forced the whole series into an inclined position, when a second granite intrusion occurred. From this later granite there came solutions that, escaping through the sheared zones of the older rocks, left there their load of silica, carbon dioxide, sulphur and iron, with minor amounts of gold and copper.

Nickel Ore

Dr. Cooke demonstrates that the nickel ore of both the Oiseau and Maskwa regions originated as mentioned above. In this connection he gives a tip to the prospector. "Attention may be called to the fact that ore-bodies cannot occur in connexion with any bodies of gabbro other than the large sills that have undergone the differentiation described. Bodies of gabbro of all sizes are to be found in many places throughout the district—dykes, which even an untrained observer can see to be of similar composition from edge to edge. It is absolutely useless to search for ore-bodies in the neighborhood of such masses; the effort is merely a waste of time and money." Dr. Cooke gives the prospector credit for acumen and reasoning power beyond the ordinary, and makes no mistake in doing so. He also points out the possibility of using the magnetometer as an aid in prospecting drift-covered areas — a method that has been of great practical use in locating similar ore in the Sudbury district.

Gold Ore

The deposits of gold ore are characterized as difficult of access and, in general, low-grade. This has prevented any important mining development by well-established companies. "Others, however," says Dr. Cooke, "less well-advised, have established workings foredoomed to failure by the poverty of the deposits exploited; and in still other instances more or less work has been done by companies as a basis of extensive stock-selling campaigns."

In his summary description of the gold deposits, Dr. Cooke says:

"The gold deposits of Rice Lake district are vein fillings and replacements in belts of schist formed by earlier faulting. The principal veins are found in shear zones that cut through the older rocks to contact with the later granite, rather than in shear zones that do not so terminate. The veins gradually decrease in size with increasing distance from the granite contact; and their composition varies in such a way as to indicate deposition from hot concentrated solutions in and close to the granite, and from cool dilute solutions at a distance. It is, therefore, concluded that the vein materials were deposited from solutions emanating from the later granite.

"The shear zones are found in the Rice Lake series and the earlier granite. The later granite also was jointed, and the joints were filled with auriferous quartz. Such veins are mostly small, although lenses 3 to 4 feet in width have been found. Prospecting in the later granite, therefore, although probably less apt to be rewarded than in the older formations, may reveal the presence of small deposits of fairly rich ore.

"The vein materials are principally quartz, albite, iron carbonate, pyrite, chalcopyrite, and free gold. The carbonate is characteristically deposited at a distance from the granite, the quartz closer to it, the albite in or very close to it. The sulphides may or may not carry gold values.

"The free gold appears, in most cases at least, to have been deposited in the quartz after it was shattered by movement. In great part it seems to have been deposited fairly close to the later granite, although found in small quantities at quite considerable distances away.

"The bodies of quartz, like the shear zones in which they occur, vary greatly in width from place to place, forming lenses both in horizontal and vertical section. Small bodies of the later granite may have formed enriched veins like the larger bodies, but the veins so formed are commonly rather short.

"Apparently, therefore, the most favourable localities for prospecting lie in the Rice Lake series or the earlier granite, near a contact with the later granite. The earlier granite may be recognized by the belts of schist and the basic dykes that cut it. The later granite is not thus cut, although it may be more or less jointed."

This report demonstrates clearly, once more, the value of geological study to the prospector and miner. Clear-cut conclusions of distinct and direct practical value are characteristic of the work of the modern economic geologist. . .

WANTED — A GRUBSTAKER

A correspondent in New Westminster, B. C. has lately located, one hundred miles east of Vancouver, a series of quartz veins containing visible gold. He describes them as from 6 inches to 48 inchees in width, in a diorite rock,and of undetermined length. He would like a partner, on a 50 - 50 basis, to provide money for development. This prospector's address can be had on application to the Journel.

From the treatment of 314,820 tons of gold ore and tailings, the Oregum Gold Mining Company of India, Limited, extracted 101,592 ounces, at a gross profit of £246,397.

The Uses of Concrete in Mines

By ANTON S. ROSING

Mining is an industry that labors under unusual difficulties. The hazards of above-ground construction and industries are accentuated below ground because of confined quarters, distance from the base of supplies and difficulties of summoning aid in emergencies. Fire, a serious enough proposition in case of surface structures, is many times more serious in a mine, where the heat and smoke are confined and intensified, forestalling adequate fire-fighting measures and preventing work, if not even the escape of the employees. Once fire has attained headway there are almost no effectual means of combatting it except sealing or flooding the mine, both of which entail complete stoppage of operations for long periods. Fire-fighting in mines must, therefore, consist largely of preventative measures, which simply means careful attention to fireproof construction at vital points and possible points of beginning, and the erection of fire and smoke-proof barriers between various divisions of the mine.

As with fire, water forms a more serious menace below ground than above. Many a mine has proved unprofitable because of pumping expenses. And as with fire, again, preventative measures are the most effective, and construction and materials must be used that will effectively and continuously exclude water and resist rot and decay. Construction at vital points in mines should always have this point carefully in view. Structures must be built so that time and wear does not result in weakening and leakage, with the resulting losses and expenses of shut downs for repairs. This is especially true of the main artery of the mine, the mine shaft. If it is to give continuous, uninterrupted, water tight service, its construction must be sound and the proper materials must be used.

The First Concreted Shaft

It is less than two decades since the first concrete lined mine shaft was built in 1903 at the Tug River mine in West Virginia. Within that time, however, concrete shaft linings have not only become recognized as the superior type of lining, but a variety of designs and methods of construction have been developed that enable the erection of fireproof, gas and water tight, and repair proof shaft linings of almost any form and under almost any condition. In Europe the value of these features has long been recognized, and mine shafts have been lined with masonry and even cast iron in the effort to obtain dryness, fire safety and freedom from maintenance expenses. But the American types of concrete linings represent a long stride in advance, from the standpoint of economy, safety, speed of erection and adaptability to unusual conditions.

A similar application of American ingenuity is to be found in the increasing use of standardized concrete units in the replacing of wooden posts for timbering or for mine props. These units may be used over and over without difficulty and have the added advantage over wood that they are rot proof and can be depended on to serve their purpose without renewal as long and under whatever conditions they are used. Standardized, pre cast units are also used in the construction of bulkheads and stoppings where the rot-proof, gas and water tight features of concrete are valuable.

Concrete-lined Hoist Room at Bunker Hill and Sullivan Mine, Kellog, Idaho

10,000 feet underground.

Indeed throughout the mine, wherever there is need for strength to sustain walls and roofs, for fire safety, water tightness, adaptability to unusual conditions and for speed of erection, there concrete is being used to an ever increasing degree because it serves as no other material can. A few of the principal adaptations of concrete to mine work will be here described.

SHAFT LINING

Concrete is now recognized as the best material for the lining of mine shafts, and is almost universally used for that purpose in this country. It is also rapidly displacing other forms of shaft lining in European and South African mines.

The reasons for this are: first, that the concrete lining is fireproof; second, it is waterproof and all the troubles due to seepage attaching to other forms of lining are permanently eliminated; third, it is permanent and need not be replaced or repaired during the life of the mine; fourth, it can be adapted to any form of shaft; the shaft need not be limited to any certain shape on account of the rigidity of the lining material. A concrete lined shaft may be square, circular, elliptical, oblong, or a combination of all these shapes in its cross section as occasion may require.

The usual method of lining shafts with concrete is in successively lower sections of suitable height, the work being done at the time the shaft is sunk. When the sinking has progressed sufficiently to make a workable job of concreting, substantial forms of wood or steel are built and the bottom opening between the form and the rock is sealed. The annular space between the form and the surrounding rock or earth is then filled with concrete from above, the mixer being placed on the surface in close proximity to the shaft opening. The concrete is either shot from the mixer through a pipe into a hopper emptying directly into the forms or, as is the usual method, lowered in buckets to a platform or hopper at the top of the forms. When the forms have been entirely filled they are left in place until the concrete has entirely set. Thereupon they can be removed, cleaned, and used again for the next lower section when this has been excavated, and this operation is repeated until the bottom of the shaft has been reached. In using this method the greatest care must be exercised that the closure joint of one section to the one next above is made watertight.

BEFORE —

The Main Haulage Way in Ray Consolidated —

In some instances, notably in the case of relining old shafts, the lining is done from the bottom of the shaft upwards, the old lining being removed from below as the placing of new lining progresses. In every other particular this method is similar to the one described above. This method may also under certain conditions be used in lining new shafts but would be limited to cases where no trouble is encountered from excessive seepage or from slipping of the rock or soil.

Concrete Shaft Timbers

Concrete mine timbers are used for the replacement of the wooden timbers in mine shafts where it is not desirable to employ the monolithic type of concrete lining. These timbers are pre-molded on the surface and after thorough seasoning are taken into the shaft and put in the position of the decayed or broken wooden timbers. The timber may be square, rectangular, or T-shaped in cross section and the ends so shaped that they will interlock and hold each other firmly in place.

In the case of existing shaft linings of wood or steel, when it is desired to increase their fire-resisting and waterproof qualities without replacing the lining itself, this may be done by enclosing the existing lining timbers in a cement plaster on wire netting or expanded metal. The mortar can best be applied by means of an apparatus like the cement gun.

Cementation in Wet Ground

In shaft sinking, if a water-bearing stratum is encountered, the difficulty may be overcome by means of a process first developed in France and now known as cementation. The process consists in drilling a number of holes arranged in a circle surrounding the shaft site into the water-bearing stratum. Into these holes is then pumped a cement grout until the fissures are entirely filled. When this has set, the sinking may proceed and no further trouble will be had from that stratum.

Shaft Lining of Concrete Slabs

A novel and efficient method for lining mine shafts from the top downward at the time of sinking has been devised by a Scotch mining engineer. This method consists of the successive interlocking of sections of pre-molded reinforced concrete blocks or slabs of Z-shaped cross section. The sections are hung one on another from the top downward, the top section being hung in the strong crow's-ring let into the standing rock at the top of the shaft. Several successive rings of the lining having been placed in position, the annular space between the lining and the surrounding rock is sealed at the bottom and the enclosed space filled with a cement mortar of suitable strength and consistency injected through holes provided in the slabs for that purpose. This mortar when set firmly binds the lining to the rock, which then carries the weight of the lining and no danger exists of breaking one section by the weight of the lower ones. The mortar also serves to effectively seal all joints and make the lining absolutely watertight.

This method dispenses with all form work in the shaft and permits the shaft sinking and shaft lining to be carried on simultaneously and without appreciably interfering with each other, the slabs having, of course, been made in sufficient quantity in advance to permit of rapid and continuous work.

A non destructible, homogeneous, fire and waterproof lining is thus produced giving uninterrupted service without maintenance expense throughout the life of the mine.

GALLERY LININGS

The best way to line galleries and passage-ways is by a monolithic reinforced concrete lining. The forms should be of the standard section, collapsible type, of wood or steel which may be erected, taken down, and moved ahead as the work progresses. This type, which is the most economical of form material, insures the greatest speed in erection and removal, insures uniform passageway area,

and may be used a great number of times without renewal.

The concrete may be mixed on the surface, lowered in buckets, and moved on cars to the form to be filled, or it may be mixed in the mine in convenient proximity to the work. In the latter case care must be exercised in regard to the materials used. Mineral ore, coal or other unsound materials should not be used for the aggregate but only clean gravel or sound rock broken to suitable size. Mine water should also not be used for the concrete as it generally contains acids, but clean fresh water should be brought from the surface.

The passageway thus lined has the great advantage of being fire and waterproof. It is also free from the annoyances due to the suspension of all traffic at frequent intervals by reason of rocks falling on the track from the roof, and once the lining is in place it will require no further thought nor worry nor will it require any expense whatever for maintenance.

The passageway should be concrete lined as soon as possible after being opened. If this is done a much thinner lining will be required than will be the case when disintegration has set in, caused by contact of air-currents with the rock.

either case it will be absolutely fireproof and an effective fire and gas barrier. If of the monolithic type the same comments on the methods of construction apply as to gallery linings.

SHOPS, TRACK TIES, ETC.

Shops, stables, hay rooms, and powder bins and similar structures may be built of monolithic concrete cast in place or of pre molded concrete blocks set in cement mortar. Either method will result in a fire and water proof and permanent structure.

Track ties should be of pre molded concrete blocks of suitable length and cross section and thoroughly seasoned before being used.

Water-bearing rock crevices in unlined galleries, shafts or rooms may be effectively plugged by shooting cement mortar into them with the cement gun. Existing mine structures may also by the same method be made fire-resisting by a coating of cement mortar applied on an expanded metal or wire enclosure.

More than ever mining engineers are finding that their job is more than that of simply building a workable mine. They must build mines that can be worked continuously and efficiently with the minimum of stoppage and the

— AFTER

— Mining Company's Mine at Ray, Arizona

PROPS AND TIMBERS

A serious difficulty in mine operation is the necessity for the frequent renewal of wooden timbers and props occasioned by the intensive wet rot that in some cases makes imperative their renewal every six months, and occasionally much more frequently. This is an expense that adds considerably to the cost of operating and maintaining the mine. This difficulty is solved and the attendant expense eliminated by the substitution of concrete timbers.

These are pre molded in a suitable shed on the surface and are usually 8 by 8 inches in size and of various lengths to suit local conditions. The edges should be beveled to prevent chipping in handling, and after having been molded the timbers should be permitted to season for two or three weeks or longer during which time they should be watered daily. When so made they can be used again and again, indefinitely, or left in one place as long as may be required, and no expense is attached to the timbering of the mine other than the cost of labor for placing it, and moving it from place to place as may be required.

BULKHEADS AND STOPPINGS

These may be constructed of either monolithic concrete cast in place or of pre molded concrete blocks set in cement mortar. The former method is preferable as it insures an absolutely tight contact with the surrounding rock and a perfectly gas-tight wall throughout. But in

minimum of avoidable expense. Fire hazards must be eliminated in every possible way. Precautions must be taken with construction that will prevent accidents and injury to personnel, which often not only prove annoyingly expensive but reduce the efficiency of labor. Leakage and rotting must be avoided in the materials of construction so that replacements will be reduced and the failure of material from unseen causes eliminated. It is because of concrete's certainability to resist fire, water, wear and rot that it is so being used increasingly as a construction material in mining.

UNDERMINED GRAVEL — PAID $200 FINE

Before Magistrate Atkinson at Iroquois Falls on May 10 Walter Monohan of Matheson was charged by the Ontario Department of Mines with undermining in an open gravel pit contrary to Rule 131 Section 161 of the Mining Act. He was fined $200 and costs.

It is not generally recognized by the public that the [illegible] of the fatal accidents in mining and quarrying operations [illegible] to a contravention of this regulation [illegible] out of all proportion to the numbers engaged in [illegible] and gravel pits. It is natural to undermine the sides of a pit and gravity induces a fall of ground. And the [illegible] of accidents in such a case has given rise to the prohibiting by law of the practice.

Gold Copper and Tin--1913-1919

BOOK REVIEW

The three latest publications of the Imperial Mineral Resources Bureau are now being distributed. They consist of three exhaustive reviews of the world's output and resources of gold, tin and copper respectively, and constitute parts of an elaborate series covering each important branch of the mineral industry for the period 1913-1919. Each of these three reviews is worthy of separate notice.

1.—GOLD, 1913-1919.—Throughout this report there is evidence of careful and painstaking selection and compilation. What figures and comparative statistics are given have not been chosen at random. The text is well edited.

The report, which, from its dimensionss, attains the dignity of deserving the appellation "volume," opens with a general geological sketch, touches on metallurgical progress, the price of gold, and the world's production, and then presents more than 300 pages of matter pertaining to the gold-bearing fields of the British Empire and of Foreign Countries.

On many pages there are facts and figures that are either new to the generality of readers, or have been forgotten by many. A glance at a few of these will not be amiss.

On page 9, reference is made to the successful use of the chlorine process of refining bullion at the Royal Mint, Ottawa, and to its adoption in Porcupine. The "Marathon" rod mill, for the comminution of lead and copper ores is also mentioned. Both these innovations in modern practice are noteworthy.

Very interesting indeed is the description (pp. 10 and 11) of the arrangement made in 1919 between the Bank of England, the Union (South Africa) Government and the gold producers, the latter represented by the Transvaal Chamber of Mines. Briefly it is as follows:—The gold producers consign all gold, refined and unrefined, to the Bank of England, witholding only enough to meet local currency needs. The Bank turns the gold over to the producers' refiners. The sale is negotiated by the producers' appointed agents, Messrs. Rothschild, at the best competitive price obtainable. The Bank has authority to issue licences for the re-export of the gold, at any time within five weeks of its arrival of the Bank. This period is lenthened by three or four weeks as the consignors cable London the amount of each shipment. All freight, insurance, refining, assaying and marketing charges are borne by the producers. The Bank is authorized to make interest-bearing advances against the gold. The effect of the whole arrangement is to provide a free market for the producers' gold. Australian producers, organized as the Gold Producers' Association, Limited, have a similarly advantageous market.

The world's production of gold is next summarized. For the period 1493-1600 (108 years) the annual output is estimated at slightly less than 250,000 ounces. The increase is not marked until the discovery of gold in California in 1848. Before this time, from 1760 onward, the Russian Empire led the world, its gold being won mostly from placers. During the period 1851-1860 (10 years) the annual average was 6,400,000 ounces. It is now close to twenty million ounces.

Of this vast total, the British Empire was credited with 67.20 per cent. in 1919, the United States with 16.52 and other countries with 16.28 per cent. The Union of South Africa contributed 47.15 per cent. of the whole; Canada, 4.34 per cent. It will be seen that Canada has yet a long road to travel before it can be esteemed a competitor of the Transvaal.

It will not be uninstructive here to compare three great gold mines, one each in the United States, the Transvaal and Canada. The Homestake, discovered in 1876, was equipped with 740 stamps in 1880. Later the number was increased to 1,020. In 1912, more than 1,500,000 tons of ore were milled, the average cost per ton being about $3.20, and the recovery of gold and silver approximately $4.40 per ton. Up to the end of 1912 (35 years) the total bullion output was $115,000,000, of which 25½ per cent. was paid out in dividends, or roughly, $29,000,000. The proved ore reserves amounted to 15,000,000 tons; probable ore, 40,000,000 tons. Since then, production has fallen greatly, owing to extrinsic causes, labour and high cost of supplies being the chief factors in the decline. Ball mills have now replaced the stamps in great part.

On the Government Gold Mines Areas, (Modderfontein), Transvaal, the developed ore reserves, at the end of 1920, were 10,291,000 tons, the average value per ton being 34.85 shillings and the stoping width 77 inches. This estimate included all ore of a value of $4 and over. But, until recently, costs were increasing so rapidly that millions of tons of lower grades of ore have to be eliminated from estimates.

Up to the end of 1921, the Hollinger had paid out $16,558,000 in dividend, out of a production of $41,193,935 (period of less than 11 years), and at that date reported about 3½ million tons of developed ore reserves, valued at $36,644,154.

The comparison is given meaning when it is remembered that the Hollinger is not yet in the prime of its production whilst the other mines have, presumably, seen their best days.

While there is much material throughout the Report that invites either comment or quotation, the limits of space will permit neither. Suffice it to say that Europe, Africa, Asia, Australia and the Americas are not neglected. Care and discrimination have been used in choosing and editing the huge mass of information comprised in this really praiseworthy volume.

2.—COPPER, 1913-1919.—One of the opening paragraphs of this report is highly significant of the fact that renewed prospecting for copper is a *sine qua non* if a cheap supply is to be counted on in the future. "It is important to realize that these enriched [secondary] deposits have yielded in the past a large part of the world's production, and that the maintenance of a supply of cheap copper will depend in large measure on the discovery of new areas of such enriched deposits, which are most likely to be found in regions of small rainfall, particularly in tropical countries." It is pointed out that large tracts of Africa, northern and eastern Asia, and south and central America still invite the explorer and prospector. Of these regions, we may add, the British Empire embraces no small part.

The world's production of copper was only 9,000 long tons per annum at the beginning of the nineteenth century; and at the close, somewhat over half-a-million tons. Over-production marked the war period. Normal requirements today probably approximate one million tons annually. Producing more than half the world's total, the United States ranks an easy first, with Chile, second and Japan third. Canada ranks sixth. The United Kingdom,

from being an important producer sixty years ago, has fallen from its high estate to a position of negligibly small account.

In the consumption of copper, before the war, the order of importance was United States, Germany, England and France.

Eighteen pages are assigned to a summary of Canada's copper resources. In this summary we are glad to notice that Manitoba comes in for due attention.

Even casual reading of the volume indicates two things very plainly, — the tremendous potentialities of various parts of the Empire, and the absolute necessity of organized exploration and prospecting.

A comparison of pre-war and post-war costs per pound of copper produced shows that they ranged in 1913, from 8.65 cents (Utah) to 14.23 cents (Calumet and Hecla); while in 1918 the corresponding range was 11.26 cents (Inspiration) and 21.05 cents (Calumet and Hecla).

The geological information interspersed throughout the volume gives it added value and meaning.

3.—TIN, 1913-1919.—What the average mining man and prospector does *not* know about tin is contained in extant literature, tin has been little regarded in Canada, and less looked for.

The only important ore of tin is cassiterite, the oxide. The great bulk of the world's output is derived from alluvial deposits. Vein workings are as yet unimportant. The present methods of smelting tin are essentially crude, and electrolytic refining has not yet been brought to a point where its advantage over older methods is firmly established.

A graph, showing average prices per ton for 140 years, indicates a widely fluctuating market. In 1870, the price was less than £70 per ton. During the later years of the Napoleonic wars, the price rose to nearly £160, fell thereafter, rose again during the Crimean campaign, and then displayed irregular movements (approximate periods of high prices recurring every 5 or 7 years) until the late war, when the ascent to £380 per ton was spectacularly rapid. Of late years it has fallen once more, the present price being round £165 per long ton.

Of the world's total output, the British Empire contributes slightly over half. In this production the Federated Malay states are by for the largest factor, Australia coming next, followed by Nigeria, United Kingdom and South Africa in order of naming. Of foreign countries, Bolivia ranks highest, contributing about one-fifth of the world's total, the Dutch East Indies ranking a good second. The aggregate smelting capacity of the various leading consuming and producing countries exceeds the annual supplies of ore, considerably.

It is somewhat anomalous that, while the United States consumes more than 40 per cent. of the world's production it produces practically no tin. In both the United States and Canada there have been local flurries over the discoveries of tin-bearing veins in granite and granite-porphyry dykes; but nothing has come of them.

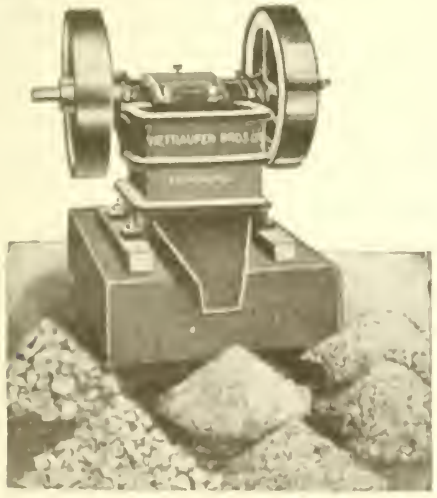
There seems to be no valid reason why payable tin deposits should not be discovered in the northern half of this continent. Incidentally, tin may be replaced in commerce by other metals, but there will ever be a strong demand for it.

To all three of the volumes thus hastily noticed are appended copious bibliographies. No Canadian who wishes to widen his point of view should neglect this opportunity of securing these excellent publications from the Imperial Mineral Resources Bureau, London, England, through H. M. Stationery Office, Imperial House, Kingsway, London, W. C.

The reviewer finds that he has omitted mention of the fact that Dr. W. G. Miller has taken a very active part in the work of the Bureau, as Canada's representative. Thus are the ties of Empire wrought and strengthened.

A CANADIAN LABORATORY CRUSHER

Heretofore it has been the universal custom to use imported crushers in the laboratories of Canada, and indeed, it has been, until recently, necessary to do so. Now there is on the market a Canadian made crusher that has been tested and proved in use sufficiently to demonstrate its sterling qualities, and it will not longer be necessary to depend upon its imported competitors.



Wettlaufer Brothers, Ltd., of Toronto, known chiefly as manufacturers of concrete mixers, hoists, rolls, etc., manufacture a crusher, illustrated herewith, that will handle almost any crushing problem where only small quantities of rock material are to be reduced. It will break rock from 3" size to a coarse sand in one operation, and is adjustable while running. It has only three bearings. The jaw plates are of manganese steel. The crushing is accomplished by means of the combined horizontal and vertical movement of the moving jaw, which is so highly effective in such a type of crusher.

This Canadian made crusher will doubtless find its way into many a laboratory throughout the mining districts of Canada as its qualities become more widely known.

A combination drum and scoop type feeder, the largest size of which has a capacity rating of 2,000 tons of dry ore per twenty four hours, has recently been designed. Such a combination enables the feeder to take a large initial feed and several hundred per cent circulating load as well.

Aside from its large capacity, all parts are reversible. This enables the purchaser to reduce his stock when he has mills operating in opposite directions, as by merely changing the parts the same feeder can be used on a mill rotating in clockwise or counter clockwise direction. Parts are made replaceable to take care of ordinary wear, so that the cost of renewing parts is small.

The initial feed is fed by a chute to the opening in the drum. A scoop on the outside of the drum operates in the ordinary feed box, but it does not have to handle large material; therefore, wear is greatly reduced and there is no danger of breakage to the box.

This feeder is manufactured by the Hardinge Company, 120 Broadway, New York, N. Y.

News of Mining

The oil shales of the Wolgan Valley, New South Wales, yield from 100 to 150 gallons of oil per ton. The oil bearing shales do not exceed four feet in thickness. It is here that the plan of burning the shales *in situ*, for the distillation of oil and the generation of power from gas, is being tried. Success has crowned the first experiments. Labour troubles are responsible primarily for this radical departure from accepted practice.

The British Institution of Petroleum Technologists started in 1918 an inquiry into the available quantity of cannel coal in Great Britain for utilization as a source of gasoline, fuel oil, and other kindred products. In its report, a special committee stated that it is practicable and commercially fusible to retort at least 1,200 tons of cannel and similar coals per day. The average yield would be 300,000 gallons of crude oil daily. The agitation of labour for the substitution of the shovel for the fork has a bearing on the amount of material ultimately available. High-ash residues are pronounced usable in producers as sources of power gas and ammonia. Low-ash residues can be briquetted. Carbonization at two temperatures is the key-note of the problem.

The Boston Montana Mining Company is reported to have begun legal proceedings against the mining engineer who recently reported adversely on its property. After publication of the (Herzig) report the company's brokers, Harris and Company, refused to act any longer in the capacity of fiscal agents for the company.

Stasite, Kasolite, Curite, Dewindtite, are the names of four new radioactive minerals identified by Professor Alfred Schyep, University of Ghent, Belgium. The fifth and sixth minerals have not yet been named. The first four are hydrous oxides of lead and uranium. The two nameless minerals are, respectively, a hydrous silicate of uranium and a uranium hydroxide.

The income account of the Phelps Dodge Corporation shows an operating loss of $8,539,068.22 for the year 1921. The Inspiration Consolidated Copper Company's loss for the year was $1,790,241.18, whilst the deficit of the North Butte Mining Company was $326,575,70.

At the Baltimore meeting of the American Electrochemical Society, April 27-29, Mr. M. C. Gilman, of Winnipeg, stated that there would soon be hydro-electric energy available in the Winnipeg district to the amount of 320,000 h.p., with a further undeveloped reserve of 250,000 h.p. A plant now nearing completion represents an outlay of only $75 per horse power, a figure much lower than corresponding costs at Niagara Falls. Mr. Gilman laid especial stress upon the abundance of accessible raw materials for the manufacture of alloys, abrasives, etc. The Society's next meeting is to be held in Montreal in September.

It is stated, unofficially, that potash compounds are now being used in Germany for the desulphurization of cast iron.

A movement to place potash upon the free list of the United States tariff is being sponsored by Senator Harris, of Georgia. The Senator claims that any other arrangement will be unduly costly to the farmers, who are the most important users.

Drilling by the Texon Oil and Land Company, in Reagan County, Texas, has revealed the presence of potash deposits that may prove commercially valuable. Samples from a depth of 1,150 feet down to a depth of 1,325 feet, contain from 2.46 per cent. potash to 8.29 per cent. The latter percentage holds for only nine feet. It will be necessary to check up all present figures by means of core drilling.

Reports from South Africa, apparently authentic, state that recent investigations there have demonstrated the existence of iron ore deposits and coking coal seams sufficiently large to warrant the immediate erection of blast-furnaces, a steel plant and by-product ovens. The project is to be financed by English and South African capitalists.

The prohibition of German trade with Australia ceases on August 1st of this year. Australians interested in the development of the domestic iron and steel industry express great alarm at the prospect of German competition. An agitation is on foot to renew the trade prohibition in modified form.

In a statement issued late in March, Mr. Colin Fraser, managing director of the Associated Smelters, Port Pirie, New South Wales, asserted that underground operations at Broken Hill could not be continued if the 35-hour week remained in force. Both mines and smelters would have to close unless costs are materially reduced. Competition with Canada, United States, and Burma, is now, according to Mr. Fraser, impossible. The Sulphide Corporation also has announced the practical closing down of its smelters because of the 35-hour week.

Adverse conditions in Norway caused the total cessation of nickel ore, molybdenite, and chrome ore mining during 1921.

Holding that foreign competition necessitated the step, the Australian Federal Arbitration Court has reduced the basic wage at the Port Pirie smelters to 12s. 8d. per day. It was formerly 14s. 8d.

The ore milled at the Transvaal Crown Mines during 1921 amounted to 2,177,000 tons, the total yield being £2,700,625. Working costs were 24s. 11½d. per ton; an increase of 1s. 2 8-10d. The payable ore reserves have an average gold content so close to working costs that the success of the property is largely dependent upon the enhanced price paid for gold — the "premium."

A representative of the Australian Chemical Institute, who visited Canada last year, refers to the method of excavating, drying and harvesting peat at the Alfred (Ont.) Demonstration Plant, as a "costly and tedious procedure." It is to be hoped that this snap opinion will be voluntarily retracted before long.

News and Comments

by Alexander Gray

Coniagas and Newray

No better evidence of abiding faith in the Ontario North Country has been forthcoming of late than the decision of the Coniagas Company to take control of and to operate Newray Mines, at Porcupine. It means more than is involved in the terms of the transfer to have Mr. Alexander Longwell accept a place upon the Newray board and to have Mr. Fraser Reid in charge; for the Coniagas always has been a standard of mining integrity and the money it made for its chief owners always has been available for reproductive purposes. Coniagas principals have tried out various propositions, at Brnce Mines, Porcupine, Larder Lake, and elsewhere. Their metallurgical works at Thorold are all-Canadian. An old and valued Coniagas Superintendent, Mr. Redington, was so familiar years ago with the Rea—or Newray as it now is known—that the incoming administration had first-hand information about the underground situation justifying this latest enterprise. Developments at the McIntyre, no doubt, were an added incentive.

At one time, the Newray ground was regarded as among the most attractive in Porcupine. Dr. Simon, an international geologist, coming from London, India and West Australia to Porcupine, told the writer the outcropping ore-body was the most impressively defined of any he had noted. Of course the geological conditions there differed from those of the Hollinger and McIntyre. That did not deter the Consolidated Goldfields of South Africa from participating in the Rea developments. Whether the blame rests upon the ground or the management, operations were suspended. Further work was talked of by the McIntyre people. Now the property will be given a chance under the best auspices; and the sporting spirit displayed prompts the hope that it will be rewarded. Mr. Redington ought to know the ground.

Granby Results in 1921

Making copper at a cost of 11.63c. a lb. in a most distressful year in which the average market price of the metal was 12.65c. and being subjected to tax levies that drew upon surplus when more capital was urgently required, prompted Executive Vice President Crabbs to pointedly remark in the annual report of the Granby Consolidated Mining and Smelting Company:

"During the three years of deflation the company has been further burdened by the retroactive tax assessments of both the Dominion of Canada and the Province of British Columbia, 1917 and 1918, taxes of the latter Government occasioning over half the decrease in surplus shown in the balance sheet.

"The decision reached to continue operation throughout the period covered by this report has conserved for your future operations a cohesive, efficient organization, working harmoniously in all departments."

And yet the popular decision as expressed by revenue departments at Ottawa and at Provincial seats is that extreme penalties must be imposed whether or not working capital be impaired and operations hindered. During the year the Granby Company had to sell 30,000 shares at $25 for additions to the hydro-electric power department. This expenditure, it is expected, will effect an economy amounting to $150,000 to $200,000 per annum. That the management is keenly alive to the need of economy throughout, and that it has succeeded while "so many perplexing problems" confronted it, is indicated by the reduction of the cost of producing copper from 15.94c. in 1920, during which year, however, the plant was only getting into its stride.

The sum and substance of the Granby year is that the properties could not surmount copper market conditions, even had taxation been less onerous. Shareholders without dividends, patiently awaiting revival, had to finance the company by taking up $750,000 worth of shares, and had to acquiesce in the extraction of a large slice of their surplus for taxes. There was a profit and loss deficit of $145,609 compared with a surplus of $497,298 at the end of 1920. The net income in 1921 was $12,828 after all expenses and charges were made, but before depreciation, compared with a deficit of $687,012 in 1920. Gross revenues of $7,234,519, contrast with $6,684,123 in 1920. Allowances for depreciation made a deficit of $287,161 for last year.

Working "for the fun of it," at Trail and Anyox, sooner or later may suggest amelioration of taxation, at least until business is brighter, and until it is certain that 1921 marked "the culmination of the depression in the copper trade." Vice President Crabbs holds that things should go better now because they could not be worse than they were last year, when a demoralized copper market "established a low average not encountered in the nineteen years next preceding." On that account, in view of the turnover and economies effected, Granby reports progress. Granby is Canada's biggest individual copper producer.

In 1921 the margin of 1.14c. per lb. between the cost of and the price obtained for Granby's copper production is proof strong as Holy Writ that every economy is necessary in this department. To produce 29,970,661 lbs. of copper, 193,283 oz. of silver, and 8,838 oz. of gold, and hardly break even after meeting fixed charges, taxes and depreciation, would have a dampening effect upon the ardor of copper-mining capitalists, were it not understood that tomorrow is another day. As 47,104,280 lbs. of copper was sold, which was 7,134,630 lbs. more than was produced in the period the chances are that 1920 cost on the carry over affected earnings. No doubt the premium metal constituted a "consolation purse" made up it was

"Canadian Money for Italy"

This is the display line over a cable announcing that Canadian and American capitalists specially interested in hydro-electric developments have investigated and will invest in Italian water powers. No one begrudges this capital to our Ally; but there is an impression that Canadian money can have profitable employement nearer home. Barcelona investments have invoked little enthusiasm. Mexican projects are nothing to brag about. Canada, especially Canadian mining areas, could do with more power.

Minerals Separation Litigation Ended

"Peace hath its victories no less renowned than war." Recognizing the unwisdom of further acrimonious litigation, the parties to all proceedings involving Minerals Separation patents, processes, and penalties, have announced an amicable settlement. Mr. Charles Hayden, a central figure in porphyry copper organizations, who is also Chairman of the International Nickel Board, being the spokesman. The great importance of this not only to the Minerals Separation Corporation, which is to have a much larger sphere, but to the Utah, Ray, Chino and Nevada Consolidated Copper Companies, as well as to the Butte and Superior company, will be recognized, more especially as Mr. Hayden explains:

"The litigation between the Minerals Separation Company and the companies named has been settled out of court to the satisfaction of both sides. From now on, the above-mentioned companies become licensees of the Minerals Separation North American Corporation. The settlement was based upon the principle of a reasonable license fee for the use of Minerals Separation flotation processes for the past and the future without penalties of any kind."

What this means to metal producers and the Minerals Separation people need not be emphasized. The Guggenheim, Granby, Lewisohn and Thompson companies do not appear in the agreement. Having the Clark, Phelps-Dodge, Ryan, Calumet and Hecla, Hayden-Stone-Jackling corporations among their licensees has the happiest auguries for Minerals Separation. Prolonged litigation has been wasteful in every sense. Now Minerals Separation will be freer to enter broader fields with the support of most influential factors in metals markets. So all is well that ends well.

Saddest of Words:—"It Might Have Been"

With "enough in sight" to hold a few pogroms and absorb the floating supplies of rubles, despondent denizens of New York's northern suburbs are in revolt against the base deception of a section of the Bolsheviki down that way. Arrests are slight recompense for their betrayal based upon the alleged discovery of a deposit of gold and platinum near Yonkers—practically next door to the Mint. To be told through the medium of a prospectus that there is $10,000,000,000 at outcrop—$8,000,000,000 in gold and $2,000,000,000 in platinum—to part with $1,000,000 for working capital, and then to find they had been buncoed, was a rude awakening that calls for hanging, drawing and quartering, and incineration of the remnants. Not only was the $10,000,000,000 an assured asset, but the phrasing of the prospectus was so plausibly devised as to make the estimate altogether too conservative; for offshoots (more stringers hardly worth mentioning) contained another $100,000,000. Hence the alacrity with which those of the Trotsky Cult (who despise wealth that is not communal) passed along their hoardings. They have lost their lucre—and what confidence they had in humankind—and may start bomb factories in reprisal. Nothing of this sort, it is hoped, will transpire in connection with the Sweet Grass Albertan deposit of platinum and gold, where the latter is subordinate, however. And yet, as Ade has just said: "A man is up against an analysis who is trying to make a paralysis."

Prejudicing Canadian Zinc

However justifiable it may have been during war-time stress, the arrangement by which the Imperial authorities will take large quantities of Australian zinc for years at a price above the market is hardly fair to competitors. It is one of the things Westminster does without mature deliberation. Canada entered upon large expenditure to meet metal requirements in an emergency. It has had to create export markets since then. Granting that Canada to a limited extent can hold its own against the field, it is significant that Japan has been purchasing thousands of tons of electrolytic zinc in Australia. This zinc is said to be of higher grade than much of the American retorted product, and it is obtainable at lower costs and by ocean freight. Japan naturally buys in the cheapest market. Patriotism that pampers one section to the impairment of others is lop-sided.

The Silver Lining

The Orient is making the pace in the markets for gold and silver bullion. Indian and Chinese exchange rates have advanced to the highest of the year. Competition between New York and Bombay for the Transvaal gold has been keen, and most of the gold has been going to India. Silver has risen 17½ cents since its low price of February and the outlook for the metal at the moment is roseate. All of which indicates that Asia is thriving. Since the middle of February India has taken £3,000,000 gold.

DEVELOPING SHININGTREE PROPERTIES

Three gold mining companies are now developing properties in the Shiningtree area, Ontario, and good results are being obtained. It is probable that work will shortly be commenced on neighbouring properties.

The Wasapika Mine has been re-opened by Ribble Mines, Ltd., with Mr. Geo. R. Rogers in charge of operations. At the Atlas, diamond-drilling is in progress under the direction of Mr. M. P. MacDonald. At the White Rock, good ore has been encountered in drifting on the second level.

Notes From Nova Scotia

The Miners' Case

At the sittings of the Scott Conciliation Board, reported in part in these pages last week, President Baxter of the United Mine Workers of America local followed Vice-President D. H. MacDougall of the British Empire Steel Corporation, and in a very able manner presented the miners' side of the case.

Mr. Baxter is a Lowland Scot of the quiet, canny and considerate type. He is just enough of a radical to keep abreast of the times, but is neither revolutionary nor reactionary; a rather safe man for workmen to follow and operators to trust.

In his opening remarks he said: "it was not the intention of the Mine Workers of Nova Scotia to press for the same wages prevailing in the United States." This cleared up the situation considerably for it had been rumored that the American Miners wage basis was just what was to be demanded before the Board. To ask this basis was to violate an understanding that the U. M. W. of A. had made with the Dominion Coal Company when recognition was given them. It was agreed by the United Mine Workers that Nova Scotia conditions would always be kept in mind when wages were being discussed and wage agreements made. Any departure from this understanding would no doubt lead to an open rupture between the Company and its employees, and would end in the Union losing the check-off.

President Baxter stated "that while making no attempt to force wages up, he stood firmly by the policy of J. L. Lewis, International President, who stated that no change downwards in the prevailing wage rates would be tolerated." Continuing, President Baxter said that the minimum rate of the Nova Scotia Collieries was $2.85 while in the American bituminous mines it was $7.50.

Wages and the cost of living were not declining in the same proportion. The reduction in wages last January was so much greater than the fall in the cost of living, that "real wages" was a thing of the past. Whatever margin of wages existed during the later part of the war over and above what was necessary to sustain life, had been more than wiped out. "Real wages" as such means the sum of the "exertions and sacrifices" necessary to maintain life. The common measure of such "exertion and sacrifice" is money; the "cost of living" means the amount of money paid out for subsistence, and a change in the cost of living means any variation in the volume of such payments. The present wage rate will not allow a workman a bare existence, for it is fallen far below a living wage.

After a further review of the wage question, President Baxter dealt with the mining conditions underground and the living conditions of the miners. He presented sixteen clauses emphasising different features of the case. The principal ones among these, apart from wages, were "the eight-hour day", "riding rakes into and in the mine," "the proper housing of employees," "increases to be given for night work and double shifted places, and for pushing boxes and pitching seams."

Housing Conditions

Referring to the housing situation, President Baxter stated that he was sure no member of the Board who had visited the houses thought the conditions were ideal. The standard of living in the mining districts was not as high as it should be and housing conditions had much to do with lowering the standards. The Board has power to deal with this question. He quoted John Mitchell, the American labour leader, on the American standard of living for an unskilled labourer "a six room house with the usual modern conveniences with a chance for privacy; enough wages to provide furniture, clothing and education for his children, and provision for accident, illness and death." On the small wage of a Nova Scotia miner this standard could not be reached.

Chairman Scott said he was impressed by the lack of drainage. Some houses were over-crowded, while others were occupied by two or three persons. Could not the Union regulate this condition? Again, the municipality had some responsibility in the matter of drainage. Mr. Baxter replied that the Company owned the streets and were wholly liable for their condition. Mr. MacCann for the Company, stated that the municipality had again and again been offered the property of the streets and refused to take them over, although they used them for laying water mains and other purposes.

The establishment of riding rakes in all collieries has been a bone of contention between company officials and the workmen for a number of years. The walk underground was very long and hard and, if men were conveyed to and from their work, better service would be given and larger outputs obtained.

Coal Production per Man

Following up his explanation of the wage clauses, President Baxter gave a table of the average coal production per man on the pay roll in Nova Scotia as taken from the Government Blue Book from the period of 1916 to 1921. He submitted statistics of the average production of the British Empire Steel Company for the same period. They are as follows:

	Long Ton.	Short Ton.
1916	1.70	1.90
1917	2.00	2.40
1918	1.79	2.00
1919	1.85	2.07
1920	1.78	1.99
1921	1.96	2.19

He claimed the figures showed that the organization of the Company was superior now to what it had ever been, and that the output of two tons per man, representing as it did every man employed, was good production. In this respect he said that the improvement shown had come from both the Company and the men.

President Baxter dealt with all the other clauses at considerable length and succeeded in making a splendid case.

The matter of local contracts was presented by Lewis MacCormick, Sub District Board Member. He stated that the Company had found it good policy to place as many of their detal men as they could on contract rates. For instance, drivers were paid so much per ton hauled and road makers so much per ton of the output of their district while pipe men were also paid by the tonnage of the district. Since the reduction of last January the distances for driving were increased and other changes made that affected local contract men in consequence of which local contracts were set aside for day work. As there were important classes upon which the output of the mine depended, the inducement should be large enough to cause all detal men to apply for local contract rates.

Secretary-Treasurer McLachlan's Evidence

James B. McLachlan, Secretary Treasurer of the U. M.

W., on Saturday afternoon presented at Glace Bay a further statement before the Scott Conciliation supporting the miners case. Mr. McLachlan delivered his evidence to the Board in his usual aggressive manner. He stated that the Montreal Agreement was not a luxurious one, but he demanded that it be maintained to provide a living wage for the workers. He denounced the Company Stores in bitter terms.

He declared further that he did not believe the Company's assertion regarding its financial position, and quoted from lengthy statements to show the profits and surpluses of the Corporation during the war period. Mr. McLachlan placed in evidence pay sheets of a large number of miners showing the average wage earned by these men, who, he said, were not the "nebulous, ethereal characters which the Company claim were getting one thousand dollars per year." He argued that the Board did not know of any man who received $1,000 or $1,700 per year, while an employee of the Company, as claimed by the Company's statement before the tribunal.

Secretary McLachlan said a peculiar question had arisen before the Board with respect to a living wage. The term, he said, was an elastic one, but he believed there could be some general conception arrived at. The wage rate of 1921 in the coal mines was enough to live on but anything lower than that rate was not a living wage. He argued that high wages would naturally follow over-production, but in this case large production was being put as a reason for low wages. "One thing I do know," said the U. M. W. Sec'y. with emphasis, "the miners are going to get a living out of this industry and there will be no peace until they do." In reply to Chairman Scott's enquiry, whether the lack of working days or lowness of the rate was mainly responsible for the unsatisfactory conditions, the U. M. W. Sec'y. submitted the pay sheets of a brattice man, showing total earnings of $68.20 for twenty-nine days and a total amount taken home in cash of $6.21 per week, the deductions to company store, doctor, hospital, etc., being $15.64 per week.

The Company Stores

Mr. McLachlan then directed some criticism to the company stores. He said the stores gave out charity doles to the men during the idle times and then when work resumed in the mine, refused to give any credit until the old accounts were wiped out. One man gave evidence showing that he had been idle for a considerable time and had run in debt to the company store. When he started work the manager of the store agreed that $2.00 per week should be kept off for back payments, but this had not been carried out. The Chairman at this point asked the Company if this statement was correct. The reply was that having no special knowledge of the case they would submit a statement later on as evidently some mistake had been made, for the agreements between the store managers and the men were usually carried out. Replying to a query from Chairman Scott, why the miners did not leave the Company store, Mr. McLachlan said that necessity forced the men to deal at these stores. "They can't get away from them, because they become so much in debt that merchants elsewhere won't give them credit." It was true, he admitted, that some men signed a power of attorney for the store manager to take the wages, but this was necessary to obtain any credit.

The U. M. W. Sec'y. said the death rate in the mines of Nova Scotia was greater than in any other part of the world. The Mines Department at Halifax was antiquated and the Inspectors were either old mine managers or other cast-off's; at best they were only fifth rate men, as the Government would not pay sufficient salary to keep a good man. Canada boasted of the best mining laws in the world, but these laws were the worst enforced. The work is hazardous, as the following figures will show. The death rate per 1000 men in the United States from 1911 was 2.78, in Nova Scotia it was 3.75, in British Columbia 5.39$\frac{3}{4}$, in Great Britain 1.30, Prussia 2.35, France 1.31, Belgium 1.06, Austria, 1.21.

Mr. McLachlan declared that the Mine Managers were often more guilty of violations than the men, who, he asserted, were often forced to go before a magistrate, lay a charge against themselves, give evidence in the case and commit perjury in order to secure a certificate from the magistrate and thus get back a job in the mine.

Gas in Mines

McLachlan cited a case at Sydney Mines in the pit in which he was employed. When the shot-firer came to fire the shot in the room, there was'nt enough oxygen in the air to permit of a match remaining lighted. Even a lighted newspaper was snuffed out. A few days later the place was filled with gas, and the lives of 600 men endangered. He had reported the case to the Mines Inspector, but that official declared he would have to take the matter up with the mine manager. He did so and "while I was threatened with court action at the time for making the statements I have made here, I never was arrested. That official did'nt have the Mine Manager arrested. Instead he was promoted. I think he should have been sent in prison."

H. J. MacCann, Asst. General Manager of the Dominion Coal Company, asked Mr. McLachlan, when the case referred to existed at Sydney Mines. Mr. McLachlan said that it was back in 1907.

The U. M. W. Sec'y followed this up with the charge that No. 24 mine was full of gas some months ago, and when the men complained, after being forced to leave the working face because of the gas, the colliery was shut down and the men forced to remain idle.

The same condition exists at No. 11 mine, but the men did not complain because they feared the Company would immediately stop work there and the miners wanted to continue. "I wanted to bring this before the Board, but the men in my Local said not to or the Company would close the pit. That's the spirit abroad here now." In addition to this Mr. McLachlan said many other things in his statement on behalf of the miners.

The facts, as known to the fully informed, show that these accusations are without foundation.

Evidence of Ministerial Association

A new feature at this Conciliation Board sitting was the appearance of members of the Ministerial Association, who gave evidence of the effect of the prolonged agitation on the morals of the workmen.

Wages and housing conditions were touched on and the clerical committee pointed to the uplifting effect of good surroundings. Clergymen of all denominations, Catholic and Protestant, appeared before the Board. The Church has decided that it will be represented in all phases of the life of the people on all future struggles.

Mining Examinations are to be held shortly, at which a large number of students will attend. The mining schools of Nova Scotia have become popular and have been of great benefit to the young men desiring to rise from the ranks. Connected with the schools are classes where preparatory instruction in English and methematics are given free to all who average attendance reaches a prescribed standard. Nova Scotian collieries are largely in the hands of the graduates of these schools.

British Columbia Letter

Survey of Iron Ore Resources Undertaken

A complete and thorough survey of the iron ore resources of British Columbia is to be commenced this summer. The Canadian Geological Survey (British Columbia Branch) has agreed to undertake this important work in co-operation with the Provincial Department of Mines. The object is to obtain conclusive information as to the possibility of this Province supporting an iron and steel plant of large capacity. Dr. G. A. Young, who has been the Survey Branch's specialist on iron ore formations for years, having prepared reports on the iron ores of New Brunswick and on the iron bearing rocks of the Belcher Islands in Hudson's Bay, is to be assigned to the same duty in this Province and will begin his field investigations in the course of a few weeks.

The appointment of Dr. Young to this task is the direct result of representations made by Hon. Wm. Sloan, Minister of Mines, who, in an interview yesterday, explained that, while it was known that ample iron ore of the necessary quality existed in British Columbia for the maintenance of a modest sized furnace, there was not that exact information as to tonnage of the raw material to assure the continuous operation of a plant of large capacity. For this reason he had sought the co-operation of the Canadian Geological Survey, through the Hon. Charles Stewart, Minister of Mines at Ottawa, and his deputy, Mr. Charles Camsell. It was a pleasure to be able to announce that, as a result of the resulting correspondence, an arrangement had been made which would settle the question of the extent of British Columbia's iron ore deposits. There was no doubt that the success of the efforts of the Department of Mines would be welcomed by the mining men of the Province, and Mr. Sloan wanted it stated that the cordial and prompt response of Hon. Mr. Stewart and his officials were appreciated.

In a letter to the Ottawa Department under date of the 24th January last Mr. Sloan asked for "the co-operation of the Geological Survey Branch of Canada in a geological and topographical survey of the iron ore deposits of this province." He suggested that, if agreeable, Dr. Young be allocated to this work because of his previous experience in this class of investigation, and pointed out that favorable consideration would be appreciated "not only by myself as Minister of Mines, but by all who are interested in the development of the mining industry of this Province."

Mr. Camsell replied under date of 10th February that Dr. Young was making a "preliminary summation of all published information on the iron ore deposits of the Province." Later came a communication from Dr W H Collins, Director of the Survey, which was responsible for the satisfactory closing of negotiations. He said that Dr Young would be given instructions to proceed with the proposed work in this Province providing the Provincial Department of Mines was prepared to do that part which properly came within its purview.

It was explained by Dr Collins that his understanding of the wishes of this Province was that "the iron ore resources of the Province should be inventoried in a manner which will admit of determining whether there are enough iron ores suitably located and of satisfactory qualities to supply a future iron and steel industry on the Coast if other essential requirements for such an industry are obtainable. If I am correct in this assumption," he continues, "it would appear necessary to make a rather careful estimate of the productive possibilities of all the larger iron ore deposits of the Province. This will be an undertaking of considerable magnitude, to the successful accomplishment of which the Geological Survey can only contribute in part. A heavy share of it will have to be done by your Department of Mines."

That the work should start with a geological examination by the Geological Survey Branch, which would serve to classify the more promising deposits in their order of prospective importance and would yield other information regarding the character of the deposits and the nature of the ores, was the opinion expressed by Dr. Collins. After making such a reconnaissance it would be possible for Dr. Young to advise "what trenching and drilling should be undertaken to ascertain more precisely the extent and character of the deposits which appeared to warrant intensive exploration." It is trenching and drilling of properties found to be of sufficient importance to warrant such development that the Province must provide for, and Dr. Collins' request for information as to the Government's willingness or otherwise to co-operate in this respect was given careful consideration by the Government.

Finally, under date of 11th inst. Mr. Sloan was able to telegraph Dr. Collins that "this matter has been fully considered by the Executive and am pleased to say that the proposal as outlined is entirely agreeable to this Government." He confirmed and amplified this by a letter of the same date saying that "the Government of British Columbia is prepared to proceed with the trenching and drilling necessary to supplement the work to be undertaken by Dr. Young. The suggestion that Dr. Young may be asked to undertake this survey is very much appreciated as it is recognized that he is exceptionally well qualified to carry it to a satisfactory conclusion." The hope was added that Dr. Young might be able to get into the field at an early date.

There are many large iron deposits that come to mind in considering those that are likely to have special attention. No doubt those of Vancouver Island and the coast sections will be carefully inspected. In the interior there are the Sand Creek Iron Deposits, situated about eight and one half miles from the Kootenay Central Ry. This property carries hematite, which makes it of unusual interest in British Columbia, where magnetites predominate. Some development has been done in the past, but never sufficient to demonstrate the tonnage of commercial ore that may be available. Another well-known interior body of iron ore that, without a doubt, will be explored are the Kitchener Iron Deposits, which cross the Crow's Nest Pass Railway at a point near the town of Kitchener and extend in a northerly direction for approximately eight miles. The ore found here, too, must be given every consideration because it is a hematite, and, from reports thus far obtaining and judging by the small amount of development already done, has commercial possibilities. On Cherry Creek near Kamloops there is a deposit of magnetite. There are three distinct zones in the main vein of this ore body, the central one being a high grade dense magnetite, free from impurities. This must be explored with a view to ascertaining the tonnage that it may be expected to yield. In northern British Columbia there are, among other iron ore resources, the limonite deposits of

the Zymoeta River section. Various estimates of the tonnage obtainable here have been made in the past. It will be the duty of the Survey, for which arrangements have been concluded, to make a thorough exploration of this area also with a view to determining the extent to which it may be depended upon to contribute to the maintenance of a British Columbia iron and steel industry.

Coast Coal Production Curtailed

The strike of coal miners in the United States and in District 18, (Eastern British Columbia and the Province of Alberta) is not having any effect on the production of the collieries of Vancouver Island. Within the last few weeks the domestic demand has fallen off and the bunker trade, which has been depressed for some months, has not shown an improvement. The result is that the mines of Comox (Canadian Collieries), Extension (same Company), Nanaimo, (Canadian Western Fuel Corporation) and Nanoose have been working short time. In some places the mines have been producing only two or three days a week. The only exception to this is at Ladysmith, where the Canadian Collieries have mines which supply practically the whole of their local market.

In the coal mining centres of the Coast there is a disposition to blame the imported fuel oil for present unsatisfactory trade conditions. A duty on foreign oil is considered the only solution and a deputation of British Columbians recently waited on the Dominion Government seeking the imposition of such a duty. Their request was promised consideration.

The Coal Strike in Crow's Nest District

In the Crow's Nest District, British Columbia, the coal strike situation shows no signs of change either for the better or the worse. There are no indications of a compromise. The mines are idle and many of the miners have obtained employment elsewhere, chiefly at lumber camps where their pay is considerably less than their own work yields. There is no excitement whatver and no disorder of any kind. Firemen and pumpmen remained at their work and the overmen and firebosses are caring for the most urgent underground repairs. What is known as the 'Knowles' Conciliation Board has been sitting in coal mining centres of British Columbia and Alberta taking evidence with a view to arriving at a satisfactory basis for settlement. The opinion of most disinterested observers is that the miners made a tactical blunder in not accepting the offer of the Company, viz., to continue at work under a scale of wages much similar to that provided by the 1917 agreement, all increases over this that might subsequently be incorporated in the agreed upon scale to be made retroactive. The U. M. W. of A. representatives, however, insisted upon the maintenance of the present scale of wages during the strike period, with no retroactive clause in the Company's favor should the final decision adversely affect the men's case.

Major A. W. Davis the New Resident Mining Engineer

Major A. W. Davis, E.M., D.S.O., has been appointed Resident Mining Engineer of Mineral Survey District No. 3, British Columbia. His headquarters will be the town of Kamloops. He will assume the duties of his new office on the 15th May next. Major Davis succeeds the late R. W. Thomson, who died some months ago. District No. 3, over which he will exercise supervision, is a central section of the Province with considerable mining possibility. While the aggregate output of the district at present is not large, comparatively speaking, there is a variety of mining, including placer, lode, and coal. Major Davis is a graduate of McGill University, Montreal. He came to British Columbia in 1898, and later joined the Canadian Consolidated Mining and Smelting Co., ultimately becoming one of its leading engineers. At the outbreak of the war he immediately enlisted. In France he was chosen to form the first Canadian Tunnelling Company. This duty he carried out with such energy and effectiveness that he was awarded the Distinguished Service Order in recognition of his services. Since returning to the Province he has been engaged in private practice at Nelson. His choice by the Provincial Government is popular among mining men of the West.

H. S. Munro, general manager of the Granby Consolidated Mining Smelting and Power Co., has returned to Anyox after an absence of some weeks. He reports that the output of the Anyox Plant for April approximated 9[illegible],123 tons. While there was no improvement in the copper market, the mine and smelter would be maintained as near as possible at capacity.

Cedar Creek placer gold discoveries are taking hundreds of men from Victoria, Vancouver, Seattle and other Pacific Coast Cities. While the snow has not entirely disappeared as yet, work has commenced on some of the claims. Messrs. Platt and Lyne, owners of Discovery, state that their property is not for sale and that it will be developed this season. The Cariboo Country will have the most thorough "combing" for gold as a result of the present excitement, since the rush of '62.

Major R. H. Crichton, who is interested in the Homestake Mine, Kitsault River, Alice Arm, says that his Company expects to resume development this month and to reach the producing stage before the end of the year.

High grade ore is being mined and sacked at the Esperanza Mine, Alice Arm. Water has stopped work on the upper workings but it will be resumed as soon as the snow goes. The Esperanza shipped ninety tons of ore to the smelter recently and is a promising property.

Iron has been discovered in the Lardeau District, B.C. There is a large body upon which nine claims have been staked. A sample assayed: Iron oxides, 77 per cent.; silica, 2.9; carbonic acid, 7.8; lime and magnesia, 5.2; with some water. Because of the high percentage of iron, and the lack of other elements in such quantity as to hinder treatment, the discovery is considered of more than usual importance.

A. Rasmusson, of Skagway, president of the Bank of Alaska, reports that there is a large influx into the Yukon this year. The silver camp at Mayo is attracting many, and if the present rate of development continues there will be an important town there in a few years. Three large companies, he says, are operating and are taking out extremely rich ore. Mr. Rasmusson is en route to New York.

The erection of a 30-ton flotation plant on its property, 12 miles south of Salmo, B.C., is proposed by the Trail Mining Company. The plant will cost $18,000 and will be driven by direct water power, the installation of which is expected to cost about $5,000. The Company has driven 350 feet on a 16 foot vein, which is said to average throughout that distance 9 ounces per ton in silver and 16 per cent. lead. A test shipment sent to the Trail Smelter brought returns of $26 a ton in silver and lead.

Livingstone Wernicke, geologist for the Treadwell interests at Mayo, was one of the first to leave for Mayo with the opening of navigation on the Yukon.

Northern Ontario Letter

THE GOLD MINES

A visit this week to all the producing mines of the Porcupine district, as well as to other properties in the development stage, clearly shows that although operations are on a large scale and great success is being achieved, yet the future holds even greater activity in store, with promise of greatly enlarged production of gold. Hollinger, Dome and McIntyre produced an aggregate of approximately $1,550,000 during the month of April. This is at the rate of $18,600,000 a year. In addition to this there is the enlargement to the McIntyre mill, which will be brought into use during the third week in June and which will add close to $100,000 a month to the output, thereby bringing the total of these three mines a rate of approximately $20,000,000 a year. Then again, added to this are the plans of the Hollinger to increase its milling equipment by fifty per cent. This may take place during the coming year and might reasonably add another $3,000,000 a year to the aggregate production.

Coniagas and Newray

The Coniagas having secured a working option on the Newray, this property will receive the benefit of work by one of the more highly efficient mine managements of the country. The terms of the deal are that the Coniagas shall receive treasury stock in the Newray at the rate of one share for every 35 cents spent on development work. It is provided that the Coniagas shall spend a minimum of $4,000 a month on the enterprise.

V. N. T.

The mine having been de-watered, mining operations resume this week at full blast on the Porcupine V. N. T. Mines and attention is turning again with renewed interest to this property.

Development work will centre entirely on the north western claim, situated adjacent to the Hollinger Consolidated and the Porcupine Crown mines. Besides having produced $808,000 from comparatively shallow workings, and on having close to $750,000 in ore in sight, there are a number of parallel veins on this north western claim in which visible gold occurs at outcrop and on which no underground work has as yet been done. The present program of development on the main vein will not only be for the purpose of continuing the main shaft from its present depth of 600 feet to a depth of 900 feet, but will also be the starting point for later lateral operations in a northwesterly direction right to the Hollinger boundary.

A feature of the situation is that the deposits already developed and being worked assure the mine of substantial gold production, while further success in opening up payable ore bodies in parallel veins would place the enterprise among the more important mines. It is toward this end that work is now in full swing under the competent management of N. J.. Evered, who is thoroughly familiar with the mine. Drifting is now under way at 600 feet deep, while sinking is under way from 600 toward 900 feet deep. Diamond drilling is also under way.

Disputed Mining claims.

The dispute over mining claims that were originally held by C. E. Pinelle and were later re staked for alleged failure to perform assessment work is due to come up this week. It is understood, however, that an application has been placed by Mr. Pinelle before Mining Commissioner T. E. Godson, K.C., for a postponement of the hearing.

More than usual interest attaches to the case due to its connection with exemption of claimholders from assessment work while in the Canadian army as well as for a long period after the close of the war. Also, further interest is added in that the outcome of the dispute will have a vital bearing on a deal which is now pending for the Moffat-Hall Gold Mines.

Clifton Porcupine Financing

A good deal of favorable comment is heard in local mining circles with regard to the method adopted by the Clifton Porcupine Mines in its present campaign to raise capital with which to erect a mill.

The directors of the company have expressed faith in the undertaking and are showing the courage of their convictions by paying out of their own pockets the cost of marketing 170,000 treasury shares at 30 cents each.

The work already done on the Clifton-Porcupine has placed considerable ore in sight. This is officially estimated at 10,000 tons containing an average of $15 a ton. In view of the work having occurred at only two levels and being limited in extent, this would indicate a good future for the mine.

Money now being raised will be used to erect a small mill and to carry work to deeper levels. In this way it is planned to place the enterprise on a paying basis, which will provide money necessary for further mill enlargement according to the volume of ore developed.

Dome

Official figures to this paper, which show that the ore being treated at the Dome Mines is yielding close to $14 per ton, are being pointed to by stockholders as an indication that the Company could now make capital repayments of one dollar every three months instead of twice a year as has generally been expected.

Already the treasury surplus is greater than what is necessary, and this fact gives rise to the belief that capital repayment may actually be made at the rate of four dollars a year, in addition to regular dividends of one dollar a year. Such a rate of disbursement, amounting to five dollars annually on each share would require $2,380,000, or at the rate of approximately $199,000 a month. The April achievement actually exceeded this amount by about $50,000.

A gross production of $300,000 monthly, or over, on ore that averages from $12 to $15 per ton, shows a net profit of approximately two thirds, or about $200,000. As to this, the production figures for the past four months show the following:

January	$300,000
February	$307,000
March	$312,000
April	$377,000

These official figures clearly show that the company has been realizing net profits at the rate of over $200,000 a month since the beginning of the year, or at the rate of over five dollars a year on each issued share.

Lake Shore

A great deal of comment is heard in connection with the question of equipping the Lake Shore mine with a larger mill. The present plant has a capacity for handling about 70 tons of ore daily as against an ore reserve of possibly 400,000 tons containing about $15 a ton. This plant, with such a volume of ore behind it, has been likened to "the

neck of a bottle" and has give rise to general speculation as to the date on which a decision may be made to install additional equipment.

Drifting at the 600-ft. level, the deepest point so far reached on the Lake Shore, has advanced over a total length of about 1,800 feet. It is obvious that by next spring, at which time the main shaft may reach a depth of 800 ft. that the work at the present deep level will have advanced pretty well to the boundaries of the property and will leave the management free to push development work immediately onthe 900 ft. level. It is considered probable that by that time the plans and specifications for a large milling plant will have been prepared.

New Power Development on Montreal River

Preliminary work is in full swing in connection with developing hydro-electric energy at Indian Chutes on the Montreal River. A siding is being laid at Beacon's Siding and a wharf is being built where the T. and N. O. Railway tracks pass close to the shore of Elk Lake. It will be possible to tranship from freight cars to scows with a minimum of effort.

There are now about 30 or 40 men employed, and this force will probably be increased in a short time.

Although no official statement has been issued, it is understood that sufficient bonds have been sold to encourage the belief that this new power development will be carried through with all possible speed. Incidentally, it points the way to widespread activity in the Fort Matachewan district, where the chief handicap has been the absence of reasonably cheap motive power.

Lebel

A group of financial men in New York have bought out the Sutherland interests in the Munroe-Kirkland group of claims, which lie just east of the Lebel Lode properties in Lebel township. In addition to having purchased the Sutherland interest, they have secured a working option on the remaining interest and will carry on aggressive work.

It was learned today that the Sutherlands were paid in cash, while the funds for conducting exploration and development work has also been provided. A first consideration will be the completion of assessment work on such of the claims as have not yet been patented. This work will be directed toward an effort to locate the extension of the big vein system located last season on the Lebel Lode property.

The energetic development of the Lebel Lode and the Munroe-Kirkland is an important extension of the work along the zone of enrichment, the western part of which is now the source of a large gold production and the eastern part of which is developing rapidly and favorably.

Bidgood

Some rich ore is being developed at the 400-ft. level of the Bidgood Gold Mines. Drifting is proceeding in both directions and already a substantial shoot of good ore has been opened up. The gold content of the vein at the present point of operation is such as to indicate a high-grade milling proposition across a good stoping width.

This enterprise holds a place among the more energetic and conservative new mining operations in Northern Ontario and is developing in such a manner as to make it likely that the question of installing a mill will be favourably considered before the passing of many months.

A promising gold discovery is reported to have been made in the south-eastern part of the township of Eby, close to the boundary of the township of Otto. Samples brought out contain visible gold, but the owners of the claims and the exact location are withheld for the time being.

THE SILVER MINES

McKinley-Darragh

The mill on the McKinley-Darragh will go into operation today, according to official advice. A force of about 30 men has been at work for the past two weeks or more getting things in shape. This force is now being increased to about 65 or 70 men.

It is planned to handle approximately 150 tons of ore daily. This will come in part from the 25,000 tons of broken ore in the mine as well as from further mining, and production may approximate 50,000 ounces of silver monthly, or about $35,000 a month at the present price of silver.

Already there is evidence that would indicate a cost of perhaps not more than 50 cents for each ounce of silver produced, or a net profit of 20 cents on each ounce. Further increase in quotations for silver would automatically increase the margin of net profit.

Activity at Elk Lake

The work of de-watering the Paragon-Hitchcock mine is under way and it is understood a plan of operation is being arranged. In addition to this, there are various rumors with regard to prospects of work being resumed on a number of other Elk Lake properties. The high price of silver and the great demand for this metal in the Far East is having a favorable influence.

Some rich specimens of silver ore have been brought in by prospectors who recently restaked a number of properties between Elk Lake and Silver Lake.

The re-treatment of tailings at the Coniages mine is again under way and this branch of work will swell the current production considerably. In addition to this, the general mining and milling operations will continue at normal rate.

Advertisements other than "Employment Wanted" or "Employees Wanted" will be inserted in this department at the rate of 20 cents per agate line (14 agate lines make one inch). $2.80 per inch, each insertion, payable in advance. Space measured from rule to rule. When four or more consecutive insertions of the same advertisement are ordered a discount of 25 per cent. will be allowed.

Advertisements of "Wanted Employment" or "Wanted word, net. Cash must accompany order. If box number is used, enclose ten cents extra for postage in forwarding replies. Minimum charge 50 cents.

Employees" will be inserted at the rate of two cents a

FOR SALE — 40 H.P. Locomotive type boiler, 18 H.P. Vertical, 95%, new, bargain price. 66 Ottawa Street, Monfreal.

FOR SALE

Complete Mine equipment consisting of:—
2 — 60 H.P. Portable Boilers Complete,
1 — Donkey Boiler with Hoist,
1 — Hoist.
1 — 3 Drill Steam Compressor.
1 — 8 x 8 Belt Driven Compressor.
1 — Electric Lighting Outfit complete.
1 — 10 Ton Capacity Holt Tractor.
1 — Leyner Drill Sharpener.
1 — 10 x 16 Farrell Crusher with Screens.
Pumps, Drills, Stoppers, Mining Equipment, etc.
Laboratory outfit with small crusher, glass ware, balances, etc
Above installed only short time and in good condition.
J. G. SIPPRELL, B.Sc., Engineering Equipment, Bedford Chambers, Halifax, N. S.

EDITORIAL

There is land of such a nature that if you sow, it does not yield crops; but if you dig, it nourishes many more than if it had borne fruit. — Xenophon — circ. 400 B. C.

THE MINERAL BANK OF CANADA

The mining industry, as the second in importance of the country's basic industries, might naturally have received more attention than it has in Mr. Fielding's budget of last week. Porcelain pump parts and four-inch pipe will not upset seriously the balance of the industry. What is the joke about those porcelain pump parts and pipes?

Mr. Fielding's pronouncement, accompanying the presenting of his budget, is a more serious affair. He discusses the nation's financial problem, but offers only a partial solution in the way of suggested measures, and none at all for the ensuing year. He has inherited from his predecessors in office a load of debt that they had not only failed to diminish but on which they had failed to pay the interest. In this hastily-prepared budget he is not able to propose constructive financial measures; he strikes a mean between the so-called Liberal principle of tariff reduction, and an increase in the semi-direct sales tax. The salutory effects of the direct income tax will be felt no more this year than last; yet direct taxation seems to be about the only corrective available for the extravagance and waste in the expenditure of funds, both private and public, that cause the Canadian to be known throughout the world as a spendthrift.

As is natural in the case of such a measure, the present Budget affects principally trade and commerce. It has little to do, directly, with the basic industries of the country—the indigenous and essential industries upon which the whole structure of the nation is built. It is the Dominion's role to tax everyone in the country, as nearly as possible in just proportion. Upon the Provincial and other local authorities devolves the responsibility for levying taxes of a particular nature; and so it is mainly with these latter that the incomes of mining and metallurgical works must be divided.

Meantime we have Mr. Fielding's admonitions to guide us. We must remember that the public coffer is no longer inexhaustible. We must cease our demands for sawdust wharves and other public works for which there is no pressing necessity. We must do our best to learn the meaning of economy, both national and personal.

The budget is not, and never can be, a really constructive measure of finance. In the present case, the nearest approach to a constructive measure is Mr. Fielding's plea for self-denial and economy. If he had been able to embody this idea in his budget, he would have taken one more step toward the ideal he expressed. Mr. Fielding is confident that a solution for our difficulty can and will be found. What will that solution be?

The only possible way for us to increase our national income up to the point where we can begin to pay our debts is to develop more fully our natural resources. To create more capital by saving will go a long way toward making us solvent; but only by drawing to a greater extent upon Mother Nature's bank account will we be able to discharge even our current obligations. Only by agricultural and mining development can this be accomplished. Economy, both national and personal, will help in large degree to create the capital necessary for this development.

It is commonly assumed that in the development that is to come, agriculture will take the leading part, and will be the essential item for progress. We doubt this. It was not so in the southern half of the continent. The fertile lands of the middle west in the United States remained untilled up to the time when the California goldfields provided the capital for a rapid expansion of agricultural operations, and drew men westward. Settlement in our own clay belt in Northern Ontario and Quebec, a region of vast possibilities for agriculture, has been stimulated mainly by mineral development.

Rapid settlement requires huge amounts of capital, and mineral deposits within our own borders are a source of capital upon which we, as a nation, need pay no interest. Thus it may well be that the sound national financial policy for the coming decades is to make available for use the funds of the great Mineral Bank of Canada.

CO-OPERATION AND PROGRESS

There is an impression, still current in some quarters though it no longer applies, that the asbestos industry of Quebec is run on the archaic lines of secrecy and exclusiveness that were the vogue in industry during the last century. This inheritance from Mediaeval times may have been cherished until recently in the asbestos camp; but today the majority of the operators realize that only by the broad minded policy of co-operation will the camp reap the full benefit of its resources, and the individual companies gain a maximum of profit from their pits.

The prevalence of the modern idea was well illustrated at a meeting of the Thetford branch of the Canadian Institute of Mining and Metallurgy, held in Thetford on

Monday of this week. Advantage was taken of the presence in the camp of a number of outside specialists in crushing problems to hold an informal discussion on crushing.

The metallurgical problem of the camp consists simply and solely in crushing and fibreizing the rock, and collecting and sorting the fibre, the latter two being simple of solution. The real problem is to crush the containing rock without destroying, that is cutting or breaking, the fibre.

The discussion showed a surprising diversity in the methods used in the various mills. This is due, no doubt, to the rule-of-thumb fashion in which mechanisms and practices have been developed in the past. But there is now being conducted in the camp some systematic research work, with a view to discovering the principles that underlie the economical crushing and fibreizing of the asbestos rock. The result of this is bound to be, here as elsewhere, the discovery of the best possible method, based on principles rather than on trial and error. It is true that the nature of the rock and of the fibre varies so throughout the camp that completely uniform practice is impossible, but this is no more than the case of the average mining camp, and indeed makes the need for the determination of the principles concerned all the more imperative. If certain fundamental principles are once determined, applicable to all cases, then the peculiar problems of each particular case can be tackled with some prospect of success; the one is foundation work, the other, superstructure.

As mentioned repeatedly by Mr. T. C. Denis in his Annual Report on Mining Operations in Quebec, the conditions under which the asbestos industry of Quebec is operating are changing very rapidly. Until comparatively recently there has been no competitor worthy of the name for Quebec asbestos. This is no longer the case. Competition for the asbestos market grows keener every year. Rhodesia is the main alternative source of supply; but there are many producing areas of smaller dimensions. The competition is world-wide, and is affected both by the development of known deposits and the discovery of new ones.

Quebec has now no monopoly of the asbestos market; but she has still a firm hold on it. Quebec asbestos is the criterion of quality, and is not yet equalled in the world. The producing area is well served by railways and is only 170 miles from Montreal, 80 miles from Quebec and 400 miles from New York. The ore reserves are very large; there is at least as much paying rock proved by development as has been extracted to date in the camp, and the limits are unknown. The factors for which Nature is responsible are all in favour of Quebec's continued pre-eminence. The human factor, notoriously uncertain in all cases, and especially a matter of comment in this case, seems to be under the control of men who will guide the destinies of the field in the safest possible way.

To an outsider it would seem that here, as is so commonly the case elsewhere, scientific research is what is most urgently needed in order to get the best products at lowest costs. This can be done best by means of a co-operative effort involving all concerned. But it is not essential that all should join in the movement. The spirit of research and of co-operation is a living, progressive thing, and is bound to win through in spite of difficulties. In this case, opposition to progressive measures is a rapidly diminishing quantity, and will soon be negligible. The meeting mentioned above is a demonstration of the spirit that is abroad in the camp today.

Soon it may be that the backs of the Quebec asbestos operators will be against the wall. Some are very near it now, and hardly realize it. Severe competition will inevitably force co-operation for mutual protection. A united Quebec asbestos industry can hold its own against the world.

THE RUSH

The open season for "rushes" is twelve months in the year; but just at this time these peculiar manifestations of gregarious human nature are likely to be most numerous. They are more spectacular than useful; yet they are bound to occur. A good rush can be organized and manipulated by one knowing old-timer; yet a thousand men will, unconsciously and fervently, do his bidding and serve his ends.

What constitutes the psychology of a rush? Why will five hundred men travel post-haste and at any sacrifice to the vicinity of a reputed "strike", when they know that only fifty, or five, of them will have aught for their pains? To answer this question would be to solve one of the riddles of human nature. Here we will merely try to delineate a few of the features, good and bad, that accompany and result from these mad stampedes after the mineral wealth that another man has discovered.

To begin with, the rush seldom includes any considerable proportion of real prospectors. The genuine prospector has a minimum of the gregarious instinct, and follows his calling, quietly and persistently, without much regard to the vagaries of the mob outside. True, he is usually the cause of the rush and becomes involved in it whether he will or not; for when he makes a promising strike and its merits (or supposed merits) become bruited abroad, he is sure to be overwhelmed with friends, old and new. Some old-timers resent such an intrusion on their privacy and such a disturbance of their exclusive right—the right of discovery. But nowadays the wide-awake prospector, with a shrewd eye on the ultimate dollar, encourages others to flock round his diggings, though only after he has done his level best to skim the cream for himself. This practice has been carried ever farther in some instances (alas! that it must be told!) Prospectors have been known even to stimulate a rush, in order to be able, under cover of the excitement, to unload their worthless claims upon unsuspecting enthusiasts. But this unworthy practice is not commonly indulged in by the real denizen of the clean, wholesome woods.

There are men with real prospecting ability who make a practice of following the rushes, one after another, as a more profitable alternative to the search for an original discovery. These men have more an eye to the almighty dollar than an instinct for their work. Their impulse is not so much to reveal Nature's secrets as to collect cold cash as rapidly and as easily as possible. Of course, this latter is characteristic of all of us, unless we except that rare bird, a practical Socialist or Communist. But when a prospector makes it a habit to concentrate his energies upon merely following up and taking advantage of the original work of a fellow-prospector, he has lost something of the fine ideal that is properly ascribed to the men of his calling. "The play's the thing" — not the receipts at the box-office.

The majority composing a rush are a non-descript crew — mainly greenhorns and miscellaneous hangers-on. Every man must learn to practice his calling. Unless the young man ambitious to become a prospector is lucky enough to become "pardner" to an old-timer, he is likely to be sucked into the maelstrom of a rush. There he will pick up a certain amount of prospector lore, though it will be well diluted with the vapourings of his get-rich-easy and get-rich-quick companions. It will not be easy to distinguish between truth and mere talk; it is all too easy to confuse genuine and counterfeit in the excitement of the race for fortune. But for the guidance of the inexperienced it is a safe rule that the old-timer who keeps himself busy with pan or rocker, or pick and shovel, is the right man to follow; the wisdom of him who spends his energy in words is more than likely to be folly or knavery.

The motley crew that comprise the major part of any stampede are hardly worth consideration. Some want excitement. Many, with the financial sense preponderating, are keen to make a quick and profitable "turn-over." Some are mere human leeches of the numerous recognized varieties. Fortunately the "bad men" of olden time are now extinct.

Above all, and through all, stands forth the work of the pioneer who located "discovery". Sometimes he has a fortune as his reward; often his share is only a pittance. But the appreciation of the discerning is for him, and for him is the reward of good work, faithfully done.

EDITORIAL NOTES

The story we print in this issue of the Journal, of the Canadian Associated Goldfields of Larder Lake, savours more of the time of the South Sea Bubble than of today. The facts as recited seem incredible; yet we know them to be the truth. Here there is one more proof of the gullibility of the general public—if proof be needed. The amazing thing is that the managers, or manipulators, of the concern have been able to convince their share holders, and possibly themselves to some extent, in spite of the evidence adduced by the best professional engineers they could find. The sad part is that among the thousands of purses that have been depleted are a large fraction that are so ill-filled that the loss will be felt keenly. We hope the recital of the story of Canadian Associated Goldfields will help investors to discriminate between legitimate and illicit mining stock flotations.

The Imperial Parliament in London has just passed a measure designed to aid the "migration within the Empire" alluded to frequently in these columns during recent weeks. The new law makes provision for the expenditure of three million pounds annually for fifteen years in assisting British settlers to become established in the various Dominions and colonies. There is an understanding that the Governments of the latter shall likewise lend assistance to the newcomers, and that the settlers shall be of a sort likely to succeed in agricultural occupations. The Motherland has, as usual, taken the lead and the main responsibility. We must now do our share. As pointed out repeatedly in these columns, we in Canada can best prepare for an influx of population by a rapid and sound development of our mining industry.

The Geological Survey at Ottawa has asked for applications for the position of Associate Geologist on its staff, the applicant to have had a thorough experience in the geology of the Maritime Provinces. The salary offered by the Civil Service Commission is, as usual, ridiculous as compared with the standing it requires in the applicant; yet the honour of associating with men of the character and calibre of our Dominion geologists, and the opportunity presented to a man of science for following up his chosen work will, we are sure, bring to the Survey the right man—if, indeed, it does not bring back to the fold one who has temporarily left for distant and greener fields.

MAXIMS

(Mr. Kipling will, no doubt, resent the liberties here taken with his poetry. If he knew how hard this imitator has had to strive for rhymes, he would feel, not anger, but pity.)

My son, if I, Hafiz, thy father,
Endeavour to sell thee my stock
In a mine, or a prospect, or quarry,
Prepare thy young soul for a shock.
It will teach thee that cleverest craftsmen
Is wisdom that no one can mock.

My son, if promoters approach thee,
Unfeelingly point to the door;
They have nothing that could'st not get cheaper
At bootleg, or tickets, or ore.
They are marked on the listings of suckers,
All those that are lacking in lore.

VATES

Notes on Prospecting in the Cariboo, B. C.*

By W. A. Johnston, Geol. Survey of Canada.

The recent discovery of placer gold on Cedar Creek, in the Quesnel district, British Columbia, is drawing prospectors once more to Cariboo, the oldest and most famous of the gold fields of the Province. The writer examined parts of the Cariboo district in 1921 and offers the following notes on the district in the hope that they may be of some value to the prospectors in their search for placer gold.

Discovery of Cedar Creek, 1862

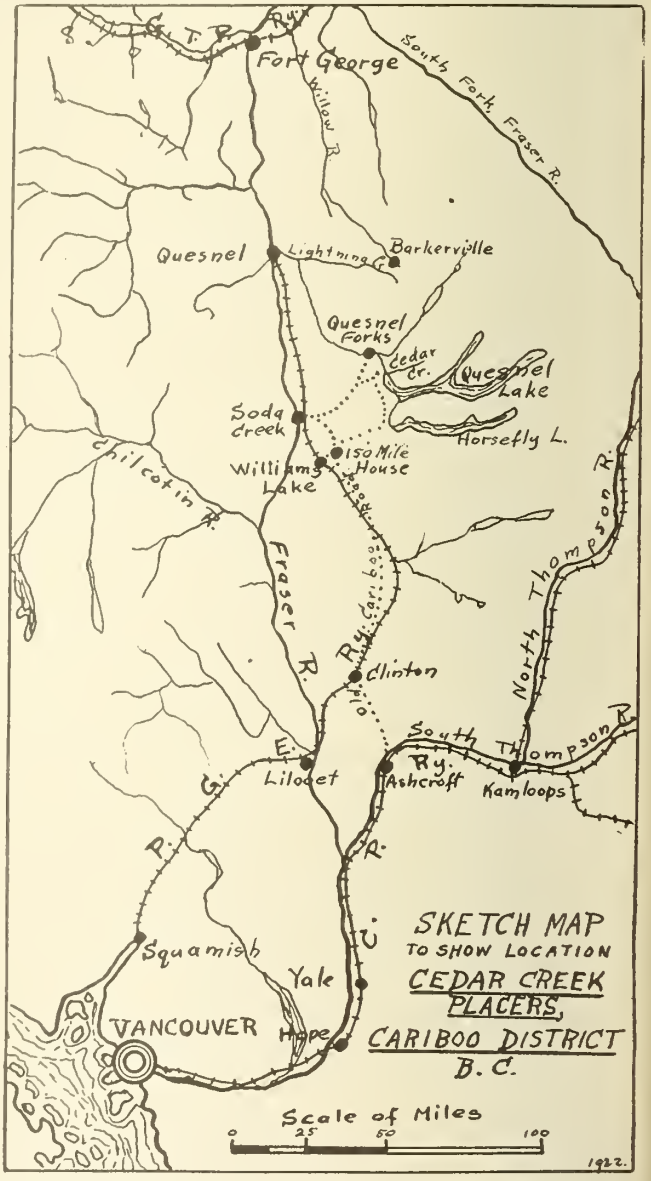
Cedar Creek is a small stream flowing into Quesnel Lake from the east, about 3 miles above the old dam at the foot of the Lake. It was first ascended by a prospecting party in 1862, but apparently, because of the important discoveries in the deep ground of Williams Creek, early in the year, was abandoned until 1865. The discovery of Cedar Creek was credited to J. E. Edwards, one of the prospectors of the famous Aurora claim at the mouth of Conklin gulch, a tributary of Williams Creek. The Cedar Creek diggings proved to be valuable, yielding steadily as well as largely for some time. Bancroft states in his history of British Columbia that the Aurora claim, with flues and sluices costing $8,000, yielded mostly in 1866, $20,000; the Moosehead claim, costing $2,000 to open, paid $7,000 the first year; the Barker claim also located in 1866, and costing $7 000 to open, paid $2,000 in a year; and the discovery claim was yielding in September 1866, $15.00 to $20.00 a day at a point where it was shallow. These claims were apparently all in the bed of the creek; the part found to be gold bearing extended upstream about 1 1-2 miles from the mouth. In September 1867 both the Aurora and Discovery were averaging $20. a day to the man. The Aurora Company in July 1867, completed a flume 2000 feet in length, dumping into Quesnel lake. Some of the ground on the bedrock yielded $2.25 to the pan and the pay dirt was from 6 to 8 feet thick. G. M. Dawson states that in 1886 the creek was largely in the hands of Chinese miners who worked it for several years by the hydraulic method on a fairly large scale. Coquette creek on Poquette creek below Cedar creek on the same side was also found to be gold-bearing in 1866. It was worked by the Chinese for several years. Several bars on the south Fork of the Quesnel and near the Forks were rich. Roses gulch on the east side between the Forks and the dam and the famous buried channel known as the Bullion property on the west side have been worked for many years.

A Tip to Prospectors

It is important for present day prospectors to know that in the 60's several thousand prospectors, many of whom were energetic and capable, were in Cariboo district and pretty thoroughly tested very many of the creeks. There are comparatively few creeks in the region in which careful search will not reveal traces of the work of the early prospector. The present-day prospector should search carefully for traces of old workings, before sinking expensive shafts, and he may be fairly certain if he finds them that the ground was well tested in the early days, unless it was deep or the water pressure was excessive. It is true, however, that the early prospector's efforts were largely restricted to testing the ground on the bars and in the beds of the present creeks and that only a few benches or high level channels were found or were searched for. The recent discovery on a bench or high level channel 600 or 700 feet above Cedar Creek shows that such channels do occur, and these are the channels the prospector should search for particularly.

The Origin of Placer Deposits

Placer gold deposits are not formed by the grinding down of rocks by glaciers as is sometimes popularly supposed. The action of glaciers is either to pluck out masses of rock and transport them in the direction of flow of the ice or to grind up the rock so fine that it is



carried away by streams. In either case there can be no appreciable concentration of gold in the channel of the glacier. Placer gold is formed by wearing away of gold-bearing rocks by streams, and is concentrated in the bed of the stream because it is too heavy to be transported by the streams, unless it is very finely divided. The greater the amount of rock eroded and the higher the original content of gold in the rock the richer the placers will be. There is evidence in the Cariboo district that hundreds, if not thousands, of feet of rock

* Published by permission of the Director, Geological Survey, Ottawa.

have been eroded in past ages, and as the rocks were in places gold-bearing, conditions were favorable for the formation of rich placers. A disturbing factor came in, however, when glaciers spread over the country, during the ice age which ended only a few thousand years ago. Many of the surface deposits consisting of sand, gravel and stony clay was formed by the glaciers or by streams issuing from the ice. The placer deposits were formed mainly before the glaciers came into existence but some, for example the bar deposits along Quesnel river, have been formed in post-glacial time, by stream erosion of the glacial drift and of the ancient placer deposits. The gold in the post-glacial placers is mostly fine; in the old channels it is coarse. The rock channels in which the present streams flows are mainly pre-glacial in age, but in places narrow, rock-walled canons are post-glacial in age. The latter rarely contain much gold. The drift deposits conceal and partly fill many of the ancient rock channels and render difficult the discovery of the gold-bearing gravels underlying the drift. The ancient gravels are distinguished from the glacial gravels by their more weathered, rusty character and by the inclusion in them of heavy minerals such as iron pyrites, galena, barytes, etc. Gold is not always present, for its presence depends upon whether the rocks from which the gravels were derived were gold-bearing. The glaciers partly destroyed the ancient placers and eroded the bedrock in places but in many places the effect of glaciation was merely to cause the placers to be buried beneath drift and in a few places the gold gravels are found practically at the surface. The presence of rotted rock near the surface in the cracks and joints of which placer gold is found shows that the rock at such places was not eroded by the glaciers to any great extent, and that it, at one time, was in the bed of a stream. The glacial drift contains little gold, but occasionally boulder-like masses of the gold-bearing gravels are included in it. Glaciation has rendered difficult the finding and recovery of the gold, but has prolonged the life of the placers of this region. If the region had not been glaciated, practically all the gold would probably have been recovered within a few years after the first discoveries.

Characteristics of Cariboo Placers

The stream valleys in the Quesnel lake and Quesnel river sections of Cariboo are frequently steep-sided and 300 to 500 feet or even more in depth, and parts of them are of different character and of different ages. The newer, lower channels are narrower and have steeper sides than the older high level channels, of which only fragments, as a rule, remain, for they have been in part cut away by the streams that have formed the new channels. In attempting to locate and trace the high level channels and benches, the surface of the bedrock should be considered rather than the surface of the drift; for this may fill inequalities in the surface of the bedrock and be itself in the form of terraces. The old channels are partly confined to the valleys of the present streams and occur as benches extending for short distances along one side or the other of the present valleys. If the old channel was gold bearing, the present creek will be enriched in the parts beneath where the old channel crossed from one side to the other, or in other words where the present channel has been cut down beneath the old channel. Some of the old channels may be independent of and cut across the present channels, and the streams in the old channels may have flowed in different directions from the present streams. The direction of flow of the old stream is occasionally indicated by "shingling" in the gravels, that is the the stones overlap downstream and dip upstream. The gradient of the ancient channels was probably only a few feet to the mile, so that if one portion is found, its extension should be looked for at nearly the same level.

Lava Flows May Cover Placers.

Another factor of importance in the Quesnel river area is the presence of lava flows and the possibility that gold placers are buried beneath them. The lava flows do not occur in the Barkerville area but are exposed near Quesnel Forks, along the trail leading to Quesnel lake, and at other places along Quesnel river. They are probably mostly of Tertiary age. It is possible that in places they fill ancient valleys and overlie gold-bearing gravels as is the case in California, but no important discoveries of this character have been made up to the present in British Columbia so far as known. The lava-buried gravels can be prospected only in those places where the streams have cut through the lava, and these places are not numerous. A few occur in the vicinity of Quesnel Forks and doubtless at other places and are well worth investigating.

The facts that discoveries of placer gold have been made in recent years in parts of the Cariboo district, which were supposed to have been thoroughly prospected in the early days, and that some of these discoveries are in high-level channels which were not recognized formerly, shows that the area is still worthy of careful prospecting. The Quesnel Lake and Quesnel river section is easy of access but is difficult to prospect because of the dense covering of timber and underbrush, which renders difficult travelling away from the trails; but for this reason it has probably not been as well prospected as other parts of the region.

THE END OF BOTTOMLEY

By Alexander Gray

At first blush it may appear that the conviction of, and seven-year sentence meted out to, Horatio Bottomley, is of no more than local interest. The result of the trial has deeper significance than the average reader attaches to it, because Bottomley, at 62 years, is a shining example of what should befall all such as he, who fleece the public while posing as leaders of thought and as benefactors. Bottomley was a mining promoter. His repute in that sphere was a long way from the best. He belonged to the Whittaker Wright, Terah Hooley school. The tragedy of Dufferin rests with men of their ilk. Wright was directly responsible for the ruin and death of Dufferin. The wonder is, in view of Bottomley's career in connection with the manipulation of mining shares, that he ran so long. By demagoguery and preying upon the frailties of human nature, he developed a large following, entered the Imperial Parliament, and many accepted his utterances on John Bull as gospel. Bottomley was *John Bull* personified. Really he was Editor, not owner, in perpetuity, although the public in general thought otherwise. Frittering in patriotism cost those who confided in him, over $500,000 and the chances are he will not survive his sentence. At any rate, his consummate nerve (of a kind) is more remarkable, if not admirable, than was the cowardice of Wright. Knowing short shrift would be given to him, Wright sat in a room adjoining the court, awaiting the verdict. He had a dose of cyanide secreted on his person. It had been covertly conveyed to him. This he swallowed, and that was his ignominious end. His betrayal of Dufferin was unpardonable. Bottomley deserves no sympathy. The patriotic pickpocket is the meanest sort of predator.

Canadian Associated Goldfields of Larder Lake

CAPITALIZED AT $30,000,000, FINANCED BY THE PUBLIC, DIRECTED BY MACKAY INTERESTS, CONDONED BY THE GOVERNMENT

BY ALEXANDER GRAY

In ye olden time the stage had serio-comics who admixed the sentimental and the jocose at slight expense. The artistry differed from the melodramatic. Audiences from pit to gallery applauded the performers—but here our parallel fails; for the stage-acting of what is now known as Canadian Associated Goldfields of Larder Lake, nominal capital $30,000,000, has not won the unanimous approval of the Ontario public. This corporation has not only induced levity, but has provided so much "sob stuff" that it now deserves a curtain call "lest we forget".

The short-memoried public has by now almost forgotten the halcyon days when "Highland Mary" and the "Silver Bird" were tickling their fancy, and bringing oodles of cash into the elaborate offices of Frank Law. Overworked letter-carriers trekked between the Toronto Post-Office and the Law counting-house (where most of the legal statutes governing the sale of mining shares were being violated). An army of clerks broke speed limits sorting letters containing remittances, while others devoted themselves to out-going correspondence describing the charms (mostly literary) of "Highland Mary" and the "Silver Bird". Frank Law was the acknowledged wizard of finance; he was the croupier with the long reach; but he rather over-reached, and the longer arm of a more powerful Law bundled him, Mary and the Bird into a large stone building where "financing" was not part of the daily routine.

Occasionally others have lapsed—the authors of "King Solomon's Mines", for instance. But these matters, though parts of such recent history, are now almost forgotten.

Punishment meted out to offenders has, however, had a restraining influence upon those who would flagrantly abuse the mails. It also brought about a limp censorship of prospectuses. Extravagant claims and covert attempts at the diversion of monies were officially scrutinized. Cobalt "bloom" no longer justified capital issues by the million; "quartz" without gold lost its hypnotic influence. Spell-binders were restrained from sequestrating all the public's small change. But that was after hundreds of millions of lithographed papers had become so many tributes to the asininity of humankind—paper of no value to junk dealers, and not amenable to vacuum cleaning until shredded.

Larder Lake on the Screen

Antedating a lot of the deviltry of the Portage Bay and Montreal River districts was the Larder Lake furore. When "bloom" and silver lost their lure, gold drew the adventurous, and stakes on frozen lakes, snow, swamps—anywhere—attested their activities. Every area staked for gold was an "old Lady of Threadneedle Street" in embryo. The Harris-Maxwell property was considered a mammoth affair. "You can put the whole thing through the mill, down to indeterminate depths," or words to that effect, declared an impetuous optimist The Dr. Reddick!—Oh, it was ready at the grass-roots for a mill! Gold!—Why, the wealth of the Incas, the treasures of Ophir, the ducats of the Spanish adventurers, were as petty cash compared with what the Harris-Maxwell-Reddick held in store! When 1906-7 ice and snow went out, there was no telling what might happen to the gold-standard!

Incidentally, Brock was commissioned to geologize the locality; and that his findings were in strict accord with the facts, is now fully proved, a decade and a half later.

Larder Lake, Abitibi Lake, Opasatika Lake—other waters when land ran short—were staked by prospectors or tucked up the governmental sleeve. Those that doubted the arrival of an Eldorado were arch-pessimists. Quebec, disappointed at not having shared in the silver development, dispatched Obalski to the Pontiac district, where he made a flying survey. The excitement was passed on to Chibogomo, where Harvie, concurring with Broek's Larder Lake conclusion, naively diagnosed Chibogomo as a section where "the gold is found to be rather widely distributed." Rawther!

Reddick Rushed Production

This was the overture. Among the occupants of front seats was Bannell Sawyer, indefatigable in pursuit of prospects. He saw in the Reddick one of those opportunities (physical and psychological) that must be taken at the flood. Nothing could be easier than to raise working capital for it. Mr. Sawyer succeeded in putting the Reddick before the public. In his zeal he brought it to the milling stage-with a second-hand mill, a pair of copper plates that defied good amalgamation, an assay office and the other requisites. He was strongly advised by this Manager to force the pace; Reddick millions in the ground were idle millions. That Mr. Sawyer was, at the moment (a critical moment), sincere, no one who knew his ardent disposition will dispute. Being an L. L. D., now he understands that "a little learning" in mining matters was not exactly safe for him. However, his Manager urged production, and the Reddick mill was rushed along.

Meanwhile, as an interlude, London was reported to be seeking control at a price about 1,000 per cent, (or was it 2,000 per cent. ?) above the Montreal share-market price of Reddicks. Mr. Sawyer considered Canadians obtuse in allowing London to get ahead of them. With commendable reserve he described how preposterous it was for the Rothschilds and Rand magnates to offer paltry sums for Reddick shares, when soon the mill would be running and there would be required a bucket elevator to take amalgam to the refinery. "'Tis to laugh!" chortled Mr. Sawyer. Inefficient amalgamating appliances had no terrors for him. He was buoyant to the point of explosion on the occasion when some of us warned him he was riding to a fall.

Enter De Pencielr — Exit Redick

Amalgam from the first clean-up was duty retorted, taken to the Ottawa Mint, and Canadian-made gold pieces were ordered. I am the proud possessor of one of these souvenirs. There were not many, for the Reddick died a'borning, of infantile paralysis. When I asked Mr. Sawyer where his mill-feed came from, he replied, "From the dumps." "Who made up the dump?," I impertinently inquired. "It was just as it came from the mine," quoth he.

Perhaps it was so. Somehow the dump was exhaustible—or working capital was, anyhow. A share market

was made, to the accompaniment of a noise like a battery in action. Ludicrously enough, two knightly Londoners, sojourners in Montreal, became interested, and awoke to find themselves plus Reddick shares but minus cash. They had to cable for funds to continue their journey.

At this juncture, a development treatment was prescribed for the ailing property, and Mr. Sawyer retained H. P. De Pencier to administer the dose, announcing that at last he had found a man big enough for such a mine. In divining Mr. De Pencier's true quality, Mr. Sawyer did not realize the sequel. Mr. De Pencier was not disposed to accept the Reddick on faith. He found that the milling ore averaged less than $1. a ton, and without further ado forswore the management. The Reddick went into liquidation, was sold under the hammer, and a trio of heros bought it in.

Capitalized, Nevertheless

To begin with, the trio had no misgivings as to their bargain. In their reckoning, the alchemy of wealth had come their way; it remained for them but to gather in the money. But their attention was given first to their Harris-Maxwell property, or Goldfields, Ltd., though the district was now in dis-favor, and though it had been found that (as Harvie intimated) the gold was "found to be rather widely distributed".

Harris-Maxwell shares were cherished by their owners. They had a "quarrying proposition" in which they, as charter members, were going to split the honors with John D. Rockefeller's original partners, Hearst and his Homestake crowd, and Agassiz' first associates in Calumet and Hecla. It was wonderful to behold this unanimity induced by the Three Horsemen among the Reddickites and the entranced Harris-Maxwellians. Ferruginous dolomite continued to grow in favour as a potential source of gold brick, and the roster of those of the Larder Lake cult was extended. The lucky owners of part of the Goldfields capital stock of $3,000,000, or any of the others with nominal issues of a few millions apiece, talked knowingly of carbonates and tellurides. Gold-mining companies were incorporated annually with total capital stock of from $250,000,000 to $320,000,000; but these enriched mainly the Provincial exchequer. Larder Lake was well represented among this galaxy of beauties; but only the Reddick and the Harris-Maxwell reached the producing stage. A grab sample of the companies created as early as 1907 has educational value. Here it is:

Companies.	Capitalization.
Empire	$1,000,000
Gold Belt	1,250,000
Gold Horse Shoe	1,500,000
Highland Mary	3,000,000
Independence	4,000,000
International	5,000,000
Big Four	1,000,000
Bonanza	1,000,000
Goldfields	1,500,000
Gold Reefs	40,000
Consolidated Gold Mines	1,000,000
Exploration & Development	500,000
Le Roi	1,000,000
Little Larder	2,000,000
Martin	1,000,000
Proprietary	3,000,000
Tourneme	2,000,000
Tighe	1,000,000

This display is fragmentary and inadequately representative of the expectations entertained during what was the year of panic elsewhere. The total of $33,790,000 is about eleven per cent. greater than the present day capital of the Canadian Associated Goldfields of Larder Lake. However, it was vouchsafed a while ago that the Associated had "assets" approximating about two thirds of the nominal 1907 capital of the eighteen companies enumerated; so the balances are adjusted in sofar as they can be until milling capacity of the Associated is shown to be not all wind-milling.

The Associated Merger

Larder Lake is now "sweet sixteen"—that is, it disclosed gold first in 1906. Unfortunately, pre-natal defects and early indiscretions have spoiled the bloom of youth.

Having concluded the first act, we can go on with the play. Enter Associated Goldfields of Larder Lake. The Reddick scene had been short; it had "got the hook" almost as soon as it came on the stage. The Harris Maxwell had spoken a line or two—"made a small contribution" to the world's store of gold, is the way Mr. Percey E. Hopkins describes it in his report on Ontario's gold. The Kerr-Addison was on the play-bill, but without a speaking part.

In more ways than one Larder Lake was a stock work affair. To date its total gold production has been "approximately $50,000."; yet this production has acted like Ponce de Leon's far-sought spring of perpetual youth in keeping alive the decrepit properties of the district.

The next scene is a quilting party, in the vein of light (but low) comedy. Bannell Sawyer withdraws to "Millionaires' Row," and George A. Mackay enters with the Tourneme property, and an attached $2,000,000 capital stock. The Tourneme prospectus was a work of art. I am doubtful whether or not his brother, R. W. Mackay, was his co-adjutor in the Tourneme. That is a detail. Dr. Mackay began early with a roseate outlook on life, and presumed the Tourneme was of a piece with the Reddick and Harris-Maxwell, as reported. The natural consequence was a patch work construction, with Reddick, Harris-Maxwell and their respective mills and Tourneme as the main piece and Lucky Boy, Kerr Addison and Gold King to fill out the corners, Raven Falls having a place near the centre. This was going to form a magic carpet, on which one could wish one's self directly into the golden streets of the New Jerusalem.

Mackay brothers were undismayed by the former records of their gold mines; no, they were super men, fit to succeed where these engineer fellows had fallen short of success. A mystery market in shares of Associated Goldfields of Larder Lake developed, an enthusiastic following supported the claims of the modest promoters, and by easy stages the shares advanced in value. It was an exceedingly neat job. It became a favor to let a friend have a few shares for a consideration. When influential capitalists proffered their assistance, provided their engineers examined the workings, the "no help needed" sign was hung out. On April 16th, 1920, when Associated Goldfields had a bulging treasury, a series of bore holes was announced by Manager Moore and the brothers Mackay as heralding a gold production never before equalled in Canada. Dr. Mackay in his address in Toronto on that date to Associated Shareholders, spoke of huge ore bodies with an average value of $5 a ton, in which were included two long lenses of high grade ore [illegible] from 30 to 140 feet wide, which diamond drilling had established to a depth of at least 500 feet. To mill this vast quantity of ore a mill of at least 1000 tons daily capacity would be immediately erected, to be ultimately increased in size to 10,000 tons capacity.

A Set Back

All appearances seemed to corroborate the Mackay claims—to the unmitiated. That was two years ago. Meanwhile the Hopkins report to the Provincial government, suggesting "detailed mining" was correctly interpreted by the initiate. The Associated company kept on drilling, but an outside engineer was retained to verify the Moore data. He did not take any samples. The drill core sampling and Manager Moore's tabulated results, convinced Clifford E. Smith that Associated shareholders needed a guardian. He could not assent to the assumption that there was a paying milling average. The original conclusion of Mr. De Pencier was reaffirmed by Mr. Smith. There was a great quantity of ore that might run a dollar to the ton, and more ore that would run less. Mr. Smith advised against the Moore plan of development. He recommended that small prospecting shafts be sunk on the foot-wall, to ascertain whether there might be local enrichments. This, he thought, would cost about $10,000. If there was nothing better than what the present workings contained, Mr. Smith favored the abandonment of the properties—which President Mackay, a few months previous, had arrayed as probably warranting an ultimate milling capacity of 10,000 tons a day. President Mackay disclaimed this advice. His share-holders were, he asserted, more than ever impressed with the potentialities of the properties; they preferred to sink a central shaft so situated as to reach the area, penetrated by several bore-holes, where the two lenses were presumed to carry their "exceptional values". President Mackay let a contract for this shaft. At that time he, Mr. Cook of Ottawa and Mr. L. A. Smith had supplied whatever assay plans and geological data there were. Associated officials were either fully informed, or oblivious to the obvious.

What George A. Gray Found

Looking around for some one competent to swing a collection of mines, an elastic mill that could be stretched to 10,000 tons daily, and manage the hydro-electric plant while prosecuting the development of high grade, and the low-grade section from 400 to 500 feet wide, George A. Gray, then with the Dome Mines, was induced to become General Manager of the Canadian Associated. President MacKay was well within the facts when he publicly stated that Mr. Gray knew his business and had the respect of those with whom he served. Moreover, Mr. Gray, it is understood, had been so impressed with what was divulged about Asociated workings and values that he was flattered by the opportunity. In December, 1920, the capitalization of the Associated company had been increased to $30,000,000 (each shareholder had received four shares for one); so it was not amiss for Mr. Gray to think on January 1st., 1921, that he was the keystone in a triumphal arch under which shareholders and he were going to march to millions. But now Mr Gray acts as though he inserted the sigh in silence. He found there was enough acreage, abundant money and script, two stamp-mills, a developed water-power, 22 miles of pole line, and a three compartment shaft down 65 feet on the Kerr-Addison ground, which was considered the most attractive for immediate milling purposes. So far: so smug. It was when he, being inquisitive, had a squint at the core ections, vertical, angular and horizontal, and a composite working map of the Harris-Maxwell and learned there was no assay plan of the Harris-Maxwell, that he registered misgivings. The Harris-Maxwell was developed by a shaft to 429 feet; lateral work done amounted to 244 feet on the 3rd level; 1705 feet on the 4th level, and 2528 feet on the fifth level. Investigation showed that 4,000 tons had been taken from an open pit and 3,000 tons from stope on the 54-foot level, reached by incline shaft. Dr Mackay milled this tonnage under his agreement with the Harris-Maxwell shareholders; but Mr. Gray did not have the record of the milling returns and no assay plans, let it be emphasized. Not only that; there was no information about three drill holes.

Mr. Gray took note of the legendary core values and the places where channels had been cut by samplers. He also jarred a crew loose from their work in barren green schist. Then he made an accurate survey of the properties and the workings throughout and entered upon a sampling campaign. On the 3rd level he took 147 samples along 297 feet; on the 4th level, 921 samples along 2,169 feet, which he re-checked; and 480 samples along 1234 feet—1548 samples in all. Putting it mildly he was a trifle dazed with the results. He went after the contact conditions on the 3rd level—and was rewarded with an ore shoot 2 feet wide and extending laterally for 70 feet. Without eliminating the higher values, the average was $9. He raised two rounds on this showing; in 8 feet the values dwindled to a trace,. 42c., 42c., $1.65. Apart from this 70-foot shoot there was nothing to be jubilant about on the 3rd level. It was the apex of a better-grade section that extended from the 3rd to the 5th level, he found out afterwards. However, he went at the 4th. level. On the contact with the dolomite and the greenstone he got $3.72, $7.04, $4.13, $4.50—nothing to write home about. Some schist went .21c., 42c., nil, etc. The other work in the dolomite on this level gave him, for example, $1.65, $1.24, occasionally a little more, generally very much less. One assay of $72.75 and another of $106.37 did not sweeten the ore shoot as it existed on this 4th level. The shoot was 90 feet long—twenty feet longer than it was on the 3rd level—and the following will give an idea how the values ran:

.62	$1.24	$3.31
$1.75	.83	16.70
2.38	2.04	1.65
1.75	4.96	3.31
1.24	2.38	2.48
.73	1.75	.56
3.32	.83	.42
1.24	.62	Trace
7.75	.62	2.07
1.65		2.48
		1.24

These will suffice. Where the results as given call for explanation, it may be said that Mr. Gray had many samples put through two and three times and then averaged. Much of the sampling yielded nothing, traces or a few cents. The better values were found in a broken quartz section in crossent 402.

Worse And More Of It

Between the 4th and 5th levels, green dolomite cut into the shaft. This affected the 5th level, where the only value in sight was a patch of free gold between the green and brown dolomite, as the position was described at the time. Sampled in three sections, 1'6" wide along 18 feet, there was free gold. There was a raise and a sub level planned—but the apparition faded before he got there. A. 160 foot shoot on this 5th level was too erratic to be useful, what teasers there were being too far apart, and at both extremities there was nothing. Between 501 and 502 crossents, here is a partial record, by sections:

$ .83	$ .62	$29.14	$ .83	$ 2.89
1.60	4.85	.62	.62	4.13
.62	.62	.83	3.10	.83

$ .42	$ .62	$ 1.65	$ .42	$ 2.19
.62	.42	.62	.83	.43
.83	.42	1.24	2.08	.83
$ .83	$ .42	$ .83	$ .83	$ .83
12.16	7.44	2.50	2.48	1.65
.62	.64	6.62	1.24	.62
$ 6.15	$ 9.50	$ 1.24	$ .62	$ 2.07
.83	9.50	2.07	.83	.42
1.04	1.24	.83	1.04	1.65
	$ .42	$ .83	$ .83	
	32.66	4.15	.42	

Space restrictions do not permit of the recounting of all the results. The foregoing portrays the best there is. The blanks are unmentionable. The average width of five feet of this shoot, between the 3rd and 5th levels, represents about 1,800 tons of ore, and on the 5th level, 55 feet of it averaged $2.60. Drilling on the horizontal on the fifth level disclosed nothing of merit.

In the 1800 feet of holes, the highest assay was $1.20. This was on the contact of the green with the gray dolomite. No. 2, of those holes, a vertical hole to intersect the vein, was put down 500 feet. It revealed no values over $1. No. 3 hole, to a depth of 339 feet had no values. Other holes feeling for extensions did not pick up anything below the 5th level. Two horizontal holes, on the 5th level, about 700 and 670 feet respectively, to test a porphyry section noted in the lower workings showed the formation to be the same as it appeared at surface. More drilling toward the Gold King, a distance of 700 feet, got nothing. Two more holes from the same set-up on the 5th level, underneath the lake, found only green schist, although some claims were made that there were showings on a near-by island. Still more drilling, to locate a bit of porphyry, failed of results.

Reddick and Kerr-Adison Results

Most of the drilling on these properties was done by Mr. Gray's predecessors. Mr. Gray sampled one section of the Reddick. In an old stope he found 4 feet of ore going $9.90, for a distance of 28 feet. This was where the Reddick got its sovereigns from, on the 80-foot level. A small section between the dolomite and schist went $3, $1.65, etc. Here and there a good assay was secured. Anyhow the Reddick had some records available. As the Kerr Addison and the Reddick had been exploited simultaneously by diamond drill, the results are conclusive. It is not proposed to give those results consecutively. One hole was put down underneath a Reddick glory hole where there was 5 feet of $26.40 ore. Then there was 10 feet of barren rock, and then 5 feet of $4 ore. Proceeding into the Kerr-Addison, four more holes went down. At one place there was 5 feet of $4 ore, and 125 feet away there were two assays of $5.60 and $5. The next hole went down 100 feet, and the best it could do was: $2.20, $4.60, $3.00, $4.20 and $12.60. Near this, another hole notified its highest result as $1.00. A diagonal hole put down 650 feet had some high spots, far apart. One went $20.00, and another $75.20. There were a few more, and they made Dr. Mckay wax eloquent however inconclusive when considered in connection with the other holes, there being no lateral or vertical continuity of enrichment. To establish this more fully it may be stated that a further hole on the Kerr Addison, the property that led to the $30,000,000 capitalization, yielded $4.60 and 20 feet from the bottom of the hole there was a $2 result. There was nothing in another hole until it was almost finished. Then $36 over 5 feet was reported, after the hole was down 400 ft. Next: at 100 and 110 ft. two assays of $7 and $12 are on the list. In the remainder of the core, two assays of $3.20 and $2.40, were the best, others being below $1.00. In the next hole, aside from four assays of $16.00, $3.40 $2.60 and $6.80, excepting one of $1.80 and $ 1.60, the others were mostly blanks. One more hole showed up $7.60, $3.00, $1.00, $2.20, $2.00, $1.00, $0.60, $2.20 and $6.00, across 5 feet, 180 feet away. At a depth of 105 feet another hole presented $3.20, and $6.40 at a depth of 300 feet. Still another gave one assay of $7.40, over 5 feet, one more of $5.60 at a depth 90 feet more, and of $4.60, at 100 feet, —zero being the judgment on the remainder of the core. A hole that penetrated to 280 feet gave one result of $30; the balance was under $1.00. Then there was a hole that evoked enthusiasm when it gave an assay of $15.40 at a depth of 55 feet. It was barren until 90 feet was reached and $14.20 was reported.

Erroneous Assumptions

This exhibit might be continued throughout. Isolated enrichments were without vertical or lateral continuity. No attempt is made to keep the records of the drill holes in their chronological order. The management persisted with a fatuity that is incomprehensible to mining men of experience; and the administration had increased the capital to $30,000,000. President Mackay arriving at the conclusions voiced in his speech. He always flouted engineers. To say that "high grade" lenses had been proved to exist for a lateral distance of "2,000 feet" was worse than nightmare. If there were any sleep-walkers, they were shareholders. Undoubtedly Manager Moore lumped his core sections in an entirely unjustifiable manner, and struck an average that was merely a bad dream. The most cursory examination of the core records and results demonstrated the hopelessness of the situation. A hungry mass of rock with values quite unrelated, appear to have induced the Associated Board and Management to persist. It is a coincidence that Harris Max well data disappeared.

At any rate, taking the drilling results as outlined (Messrs. Cook and Moore being responsible for most of the work) the three compartment shaft was down a short distance when George A. Gray assumed the management. Between 18 and 10 feet in this shaft, it will be recalled that the presence of some free gold was promptly communicated to the public. There was no more of it, that was mentionable, until a depth of 190 feet was reached. At that point, there was a pocket of specimen rock. It was a mere "kidney", without dimensions of moment. At a depth of 190 feet in the shaft, there was another similar pocket, though not so rich. The shaft was in barren rock all the way down to 316 feet, except that in cutting a station at the first of 175 foot level a few specks of gold were observed. Work began on the first level near No. 21 borehole which cut the south contact. In the south crosscut there was one 3 foot section that gave $9.20. The spot was re cut and it went 21 cents. It was more of a vug than a pocket nine inches square not much to brag about as a source of mill feed. In the north crosscut, a start was made on 6 feet of $5.10 ore, one check assay giving $11.20. When the spot was cut under, the find was proved to be a cooling crack in which assays of 12c and a trace formed a host [illegible] cut-off of stringers. In a little greywacke [illegible] $2.06 etc. and other [illegible] were picked up, 20 feet away. On another wall about twenty seven feet away, 3 feet of slightly schisted broken quartz gave $35.12 and $2.38. Further along by twen[illegible]

ty-one feet, the values were 83c and 63c. A drift was started on a cooling crack and was carried in for 90 feet. There was $2.48 in the heading. Three samples across 6 feet for a lateral distance of 1' 7" yielded $3.93, $14.88, and 11c. A check taken from one side gave 21c, 21c, and 11c. The check taken from the other side went 95c, nil, $1.52. A round out of the drift went $3.31 and 21c. A section below this went 21c. One spot went $28.41 along three feet.

Piling on The Agonies

George Gray had a heavy track and an impost that would put a less courageous manager among the also-rans. His first lateral development made him sicker than hope deferred. Taking up the 2nd or 300-foot level, he thought he would try out both contacts. On the south wall there was nothing. Where there was some oxidation and a cooling crack with a showing of free gold, he started a drift. The crack lasted 5 feet. In a distance of 106 feet he encountered two more pockets. He went 40 feet before he got a $6.20 assay, a trace, $8.27 and $1.26. Going to the right about, north from the north crossent there was 3 feet of $11.57 ore. On the opposite there was a blank. On the west wall, 24 feet away, there was a lonesome $24.40 over 3 feet, the opposite wall being blank.

It is unnecessary to enumerate more results. Mr. Gray having explored the underground in connection with some of the drilling, realized the folly of it all, after doing 1150 feet of lateral work. He was completely convinced that pastures new were preferable. He had kept President Mckay and the Board fully advised on what was transpiring. During his brief incumbency he had done half as much work as was accomplished in the twelve or thirteen years previously.

Last October he took advantage of a dispute with a contractor to propose to pull the pumps and stop the travesty. President Mackay was fatuous. Certain of his colleagues of the Board decided to face the inevitable; it was a case of death-bed repentance and a resolution was passed restricting operations to surface prospecting. That there was an utter absence of sound judgment and frankness throughout, cannot be questioned, however much the Directors were guided by their advisors. In lumping his core and striking an average, Mr. Moore erred. As a notation opposite one borehole, notwithstanding there was nothing below 350 feet, he wrote that from 400 to 675 feet, "the core was principally chlorite schist with very little quartz", yet this showed "infiltration from surrounding and higher-grade ore surrounding this stratum."

No more extraordinary stunts have been preformed in the history of the Ontario North Country. As to Canadian Goldfields shareholders. What are they going to do about it? "There are none so blind as those who will not see".

Now for some pertinent questions:

How many shares did officials sell while all of this was going on, and the generality of shares were pooled?

Why did President Mackay say Manager Gray's report was not ready for the last Annual Meeting, when the Directors already had resolved to stop underground work on the wonderful Kerr-Addison?

Where are those "assets", approximating $23,000,000? Are they in the weakened treasury, the practically abondoned properties, a later prodigy that cost $6,000, or the Raven Falls power plant?

Is it all a laughing, a crying, or another sort of matter to have this grotesque "financing" end in a fiasco?

P. S., and Sequel

Stories with throbs, if not sobs, should have a sequel. A Happy Ending is not always possible. What became of the Larder Lake properties and their be-millioned potentialities, never has been the subject of official statement to shareholders. To all intents and purposes, they are on their way to the crushing stage. Unofficially it is known that work was concentrated at another area, also in the Larder. This ground was bought for about $6,000, a modest amount for a $30,000,000 corporation. A plant was installed and the power line was extended to it. Mr. Rolfe is in charge. The property adjoins that drilled by Crown Reserve, where a low-grade section may or may not make a mine; at any rate it will not be sufficient for Associated capitalization. Instead of Associated shareholders being confided in, and the truth imparted as to the mining situation at the Kerr-Addison, Harris-Maxwell, Reddick, etc., here is what they received ten days ago:

"Telephone, Adelaide 5682.

"Canadian Associated Goldfields, Limited

"306-7-8 C. P. R. Building, Toronto.

"May 8th, 1922.

"Dear Sir:—

"Your Directors wish to advise that the work is progressing well at the mines. Our shaft has now reached a depth of three hundred and twenty-five feet, which should be considered very satisfactory. At the three hundred and seventy-five foot level another station will be cut and from here a crosscut will be run across our ore body. Everything possible is being done to drive this work vigorously.

"The demand for power is rapidly growing in our district.

"On the adjoining property the Crown Reserve Mining Company have erected a complement of large and substantial buildings, and have commenced sinking a large three compartment shaft.

"A number of other companies are also starting operations in the vicinity.

"Yours very truly,

"R. W. MACKAY,

"Secretary."

This is what is in sight after several years of misguided effort. Secretary Mackay writes of "progress" at the "*Mines*"! It is charitable to draw the inference that this is a lapse.

Correspondence

FELDSPAR IN QUEBEC

Editor's Note: The following letter from Mr. Melkman setting forth the claims of Quebec as a potential producer of feldspar, is much to the point. We can hardly subscribe to his statement that previous writers in the Journal have ignored Quebec's feldspar production and potentialities; but we can add to his statement the fact that to-day Quebec is supplying from the Buckingham district, a large fraction of the Dominion's feldspar production.

To the Editor,

Canadian Mining Journal.

Sir,

I have followed with the greatest interest the various articles which have appeared within the past few months in your valuable columns, dealing with the exploitation of feldspar properties in Canada.

Most of the gentlemen who have contributed to these articles seem to take it for granted that there is only one part of the Dominion of Canada capable of pro-

viding foreign markets with good feldspar, and that, according to them, is the province of Ontario. I do not know whether all of these gentlemen have any special interest in Ontario, but I take it that any writing dealing with Canadian feldspar should be broad-minded enough in its scope to describe other potential sources of supply, even though they be located in Quebec Province.

I have special reference to the last article on feldspar by Mr. Segsworth which appeared in your issue of the 12th May, wherein Mr. Segsworth seems to absolutely ignore the existance of any feldspar at all within the province of Quebec. I will endeaver to show Mr. Segsworth and anyone else interested in the subject that there is more high grade potash feldspar to be had within the province of Quebec than in any other part of the world, not excluding Ontario.

Mr. Segsworth's article seems to lay special stress upon the potentialities of the Richardson feldspar quarries, and he mentions an available tonnage of three hundred thousand tons of 'spar. I am quite satisfied that there isn't any such tonnage left in the Richardson quarry, and it is more than likely that Mr. Segsworth was carried away by his enthusiasm.

I should very much like to have some of these gentlemen from Ontario visit what is known in our Departments of Mines at Quebec and Ottawa as the Maniconagan Bay Feldspar Mine, situated in the Seigniory of Mingan, on the St. Lawrence Gulf, opposite the island of Anticosti, consisting of a peninsula about one and-a-half mile long by about three eighths of a mile in width, surrounded entirely by deep water. This property was recognized as far back as 1863 by the late Sir William Logan, and Dr. T. Sterry Hunt, both of the Candian Geological Survey, as he largest known deposit of feldspar. Subsequent examinations of the same property by numerous eminent engineers have confirmed this report, and one only needs to look at the reports on this property by Mr. J. B. Tyrrell of Toronto; Mr. H. S. Denny of the Denny Engineering Company of London, England; Mr. Hugh Spence of the Department of Mines at Ottawa; Mr. A. Gordon Spencer of Montreal; Professor J. T. Singewald, Jr. of John Hopkins University, Baltimore, and others, to come to the conclusion that either these gentlemen were laboring under a delusion, or else it is a fact not to be denied that the Maniconagan Bay Feldspar Deposit is the greatest in existence.

I will quote the last few lines from Mr. Tyrrell's report as follows:-

"Several millions of tons of feldspar in this form, which is the 'Standard Feldspar' of commerce, could be mined or quarried from this little peninsula above the level of the tide water and afterwards, if desired, doubtles very much more could be secured below tide water level." As the feldspar occurs right on the edge of tide-water, where the rock could be loaded into ocean going vessels at trifling cost, it should be possible to mine or deliver it anywhere on the Atlantic Coast or in England at a very cheap rate per ton."

Is there anyone in Canada inclined to call Mr. Tyrrell a dreamer? I hardly think so. That being the case, we may safely assume that there are millions of tons of commercial feldspar in sight on this property. What is more, ninety per cent of this spar is milkwhite in appearance.

I became identified with the development of this property in 1918, and while no feldspar has been shipped from this mine so far, due to the fact that there is no wharf capable of accommodating vessels, the development work carried on during that time has more than proved the statements contained in the reports by the above named engineers. It would be like gilding gold to describe the results obtained from the work performed. We simply proved what the engineers claimed.

A new company, just organized, will commence the permanent exploitation of this property in the course of this year, and it will not be very long before Ontario will have to admit that Quebec is perfectly capable of holding its own, and more, in the feldspar business.

It would not be fair to point to the tremendous feldspar resources in this property alone when speaking of Quebec, and in full justice to other owners of important felspar deposits within Quebec, I would point out that in the Gatineau River District and in the region of Buckingham there exist several feldspar quarries equal in extent and value to the best known in the Verona District, Ontario. In this respect I must disagree with what has been stated in the past, viz: that the deposits of the Ottawa neighborhood in Quebec are inferior to those of the Verona district. Can anyone think of a more valuable feldspar deposit than the one belonging to Mr. M. J. O'Brien and known as the Villeneuve Quarry?

True enough, transportation problems and high rail freight rates so far have interfered with the intensive working of these deposits, but assuming that proper transportation facilities were at the disposal of these Quebec operators they could hold their own against any of the Ontario producers.

In Mr. Segsworth's article he mentions that certain industrial companies outside of Canada prefer Ontario feldspar to any other. This doesn't seem correct, if we admit that the Maniconagan Bay Felspar deposit contains millions of tons of high grade potash feldspar, analysing:-

65 per cent. Silicon Oxide
19 per cent. Alumina
12 per cent. Potash
3 per cent. Soda
0.25 per cent Ferric Oxide
0.75 per cent. Moisture

This is not a random analysis, and I assure you, Mr. Editor, that this property can furnish vast quantities of feldspar analysing exactly as the above figures. The melting point of this 'spar is 1317° C.

I submitted large samples of this feldspar to the Royal Porcelain Works at Charlottenburg in Sweden, and they determined that it was the best spar they ever handled. You must remember that the Royal Porcelain Works at Charlottenburg were the very first porcelain manufacturers to use feldspar at all, about one hundred and thirty years ago. Of course, this feldspar has also been tried out by numerous consumers in the United States and there certainly is no question as to the fact that if we take the Maniconagan Bay spar deposit together with some of the other Quebec deposits already mentioned, the time is not far distant that Quebec will take the front rank in the feldspar field and will maintain that position throughout generations to come.

While I do not deny that Ontario has been very successful so far as regards the production and sale of feldspar, I claim that it was and is due to the fact that until this date Quebec has not made any effort in this line. We are about to see a decided change in this position, and if there are any of the Ontario gentlemen to doubt this, time will tell.

Yours etc.

Montreal, May 23rd 1922. S. E. Melkman

News of Mining

Writing in *Saturday Evening Post*, Mr. Ellis Searles, editor of the *United Mine Workers' Journal*, quoted Mr. J. D. A. Morrow, vice president of the National Coal Association, as giving evidence to the effect that the labour cost in the production of bituminous coal in the United States is $1.972 per ton, and that the average retail selling price is $10.41. Mr. Morrow immediately wrote a correction of Mr. Searles' apparent misquotation. Mr. Morrow states emphatically that the National Coal Association has nothing to do with retailing; that about 88 per cent. of the total production of bituminous coal is bought in carload lots by the user and never passes through the hands of the retailer; and that the cost to the consumer is simply the mine price plus the freight rate, which rate is paid by the consumer. Mr. Morrow shows the labour cost in the unionized fields is the only remaining item that has not been reduced.

Recent discussion of spontaneous combustion of coal in mines, especially the discussion held before the South Staffordshire and Warwickshire Institute of Mining Engineers, held at Birmingham, has thrown considerable light on a vexed question. Adequate insulation is the proper means of preventing combustion due to the absorption of oxygen. It is now believed that fire will occur from natural causes wherever iron pyrite is present in sufficient quantities exposed to air. Control legislation is being sought.

The Government of the Argentine Republic has purchased 10 storage tanks (capacity, 6,000 to 8,000 tons) for erection in the oilfield at Comodoro Riva-davia. A large British tank steamer has also been purchased. The Anglo-Persian Oil Company is already operating in the district, as also are Belgian, Argentine and German syndicates.

Several decades ago the erection of a small blast-furnace at Corral, Chile, marked what was intended to be the beginning of a large iron and steel industry. Now the chief activity is confined to a steel plant, capacity 2,000 tons of steel per annum, which sells direct to the State Railway. The Compania Shilena Electro-Metallurgica, is the operating company. The plant is being enlarged this year.

A tax of approximately eight cents per ton is to be levied on coal produced in the Bihar and Orissa districts, India. As this would presumably be followed by taxation in other provinces, it is being vigorously opposed.

The production of iron ore in Alsace and Lorraine shows decided improvement. Last year (1921) the output per man for each shift (hewers and trammers) was 8.22 tons. This compares very favourably with 7.80 tons, 6.66 tons, 6 tons and 7.06 tons, the individual shift output during respectively the years 1920, 1919, 1918 and 1913. The output average for all underground, and surface workers during 1921 was 3.43 tons, as against 4.39 tons in 1913.

The Fordney (U.S.) Tariff Bill is attracting much attention amongst steel manufacturers in Great Britain. It is claimed that if the proposed duties be imposed, the effect will be disastrous to the export trade in engineering tools, high speed steels, cutlery, etc. A deputation of English steel manufacturers has sailed for Washington to present their views on the subject. The ostensible object of the Fordney Bill is protection against German competition.

Careful surveys of the situation show that metal mining in the United States is not yet observably affected by the coal strike. Only a few of the larger copper mining and smelting plants are idle. Others are working at from 40 to 80 per cent. capacity. Gold and zinc and lead mining are rapidly returning to normal.

The operating profit of the East Butte Copper Mining Company for the year 1921, was $201,835.48. The cost of production per pound, calculated on copper delivered at New York, was 11.2804 cents. The Mohawk Mining Company showed a similar profit of $270,271.80. The cost to the Company of producing refined copper was 15.598 cents per pound.

An English observer, Colonel Harry E. Aykroyd, writing in the Petroleum Times, points out that the great profits yielded by the oil industry have constituted a drawback to scientific investigation of available oil-bearing shales. The externally-heated retort, remarks Colonel Aykroyd, is slowly but surely giving way to the internally-heated type. The use of the latter type makes possible the treatment of great bodies of shales, high in sulphur content, in Norfolk and elsewhere. Norfolk shale will yield only 22 pounds of ammonium sulphate in the former type of retort, as compared with more than 60 pounds in the internally-heated retort. The oil yield for each per cent. of volatile hydrocarbon contained in the shale is also increased by 25 to 37 per cent. The development of the oil shale deposits of Great Britain would, it is claimed, add not less than £1,000,000,000 to the wealth of the nation, employ large numbers of men, and make the country self-sustaining as regards petroleum.

In the Connellsville coal field many striking coke workers and miners are returning to work on account of the failure of the United Mine Workers organization to supply strike "benefit" funds. The State Police have notified strikers that absolutely no intimidation will be tolerated. Production of coal hereabouts is about one-third of what it was immediately before the strike was declared.

From the latest available official figures it is learned that Canada was the largest consumer of zinc oxide exported from the United States during 1920. The quantity taken by Canada was 4,924 tons; all Europe took only 1,168 tons.

Alaska produced 26 short tons of tin concentrate in 1920. This fell 60 tons below the production of the previous year. It represented 16 tons of recoverable metallic tin and was won by a dredge operating in the tin-bearing placers of the York district of Seward Peninsula. Near Hill City, South Dakota, the National Tin Corporation reports mining and milling 800 tons of tin ore, which produced 12 tons of concentrate.

Notes From Nova Scotia

Scott Board has Finished its Work

The Scott Conciliation Board concluded its labours in Halifax on May the 24th. The work done by the Board was almost equal to that accomplished by the Royal commission two years ago. The Award in its main features shows little change from that of the Gillen Board. The offer of the Dominion Coal Company of March 21st., to establish the minimum wage at $3.00 per day instead of $2.85, has been included. A number of minor adjustments have been recommended.

How the Award will be accepted by the workmen is the general query, but the anxiety of the earlier winter months over the Gillen Award is absent. The public have had all they want of investigation into the affairs of the Dominion Coal Company and they are satisfied that the miners of Nova Scotia should now get down to work. Neither the Coal Company nor the miners can afford to reject the award. The party failing to accept it will lose public symphathy and that means everything in the winning of a wage dispute. The Award of the Conciliation Board is the decision of the public, for once a dispute of this nature passes from the contending parties to a third party for settlement, it is considered a public question and the findings are virtually, if not actually, binding. For after all, public opinion is the great arbiter of all public questions, and whether we accept the verdict gracefully or reject it with wrath, we must inevitably bow before it. The public may not have any visible power to enforce its decrees, but once made they remain firm and immutable. If, for a time, we are able to evade them as was done in the case of the Gillen Award, the price exacted is very heavy, and at best is a dead loss. Even had the Scott Award carried increases, these would have had to be large to reimburse the miners for loss sustained during the hopless campaign of striking on the job.

Hearings of the Board on the Mainland

The sittings held in Stellarton, Pictou County and Springhill, Cumberland County, developed no new features of the case, except that the Pictou miners complained bitterly of lack of employment and the Springhill men of over crowding. This later feature is due to the loss of one of the slopes which occurred some years ago. A splendid spirit was exhibited by the Springhill men towards the mine officials and the Dominion Coal Company.

The rebuttal evidence of the Coal Company was submitted and the summing up of their case was done in a masterly way by D. H. MacDougall, Vice President. Robert Baxter for the men again touched on the salient features of the case. Mr. Baxter made out a good case and won the respect of the Board and all interested who heard him.

W. Herd, Company Mining Engineer, stated that the Collieries were in safe condition, that No. 24 mine, which Mc. McLachlan said very dangerous, was a safe mine, and no gas had been found in it since it was opened. No. 11 mine was also in safe condition, and Princess at Sydney Mines was as safe as any mine that the Company had.

A statement showing all wages earned in all collieries was submitted. The earnings of many men were very large and the average good. J. B. McLachlan had challanged the Comapny to produce a miner earning over $1000 during last year. A list showing the names of 118 men was entered, whose wages ranged from $1,550 to $3,686 per year. Of these,

13	workmen	earned	over	$1,550,
12	"	"	"	1,600
11	"	"	"	1,700
19	"	"	"	1,800
17	"	"	"	2,000
14	"	"	"	2,100
7	"	"	"	2,200
5	"	"	"	2,300
3	"	"	"	2,400
2	"	"	"	2,500
2	"	"	"	2,600
2	"	"	"	2,800
2	"	"	"	2,900
2	"	"	"	3,062
1	"	"	"	3,401
1	"	"	"	3,686

Hundreds of other workmen were well over $1,000, and the year 1921 had much broken time.

The Mines are Safe

What diabolical spirit has possession of Sec'y. McLachlan of the United Mine Workers, who wants to blight and blast everything and everyone that he cannot control? The public were ready to give the case of the miners a thorough investigation to ascertain the truth and reach a common ground, but when Mr. McLachlan went out of his way to tell the world that No. 24 Colliery had been in a dangerous condition through gas, while no gas had ever been found in it, it was freely admitted that the case of the men was in the hands of a man incapable of sanely presenting it or of telling the truth and it was sure to suffer. His picture of men being terrorized to the point of hiding such conditions is openly characterized by all self respecting miners as "bull" and "bluff," for there is not one miner anywhere in the Company's employ who fears to report a dangerous condition. It is not in the nature of miners to be afraid of the employers. They never were and never will be. But they are afraid to lose their lives, and for this reason if for no other they will and do report unsafe condition.

The Mines Regulation Act of Nova Scotia makes provision for the Examination of any coal mine by a committee of the workmen when it is thought necessary. No. 24 mine was reported unsafe at a meeting of the U. M. W. of A., and a committee was immediately appointed and sent into the mine to examine it. They returned and reported that no gas was found in the mine. Yet knowing this, Sec'y McLachlan blazens it broadcast that the mine was dangerous. The most dangerous and destructive force around the collieries is Mr. McLachlan himself, there is enough explosive mixture in McLachlan's make up to send him off at any time. To drive his arguments home McLachlan referred to an instance in his own mining experience which on being

question he had to admit occurred 15 years ago. No man knows better than McLachlan that there has been tremendous improvement since 1907 in everything that pertains to the miners' welfare.

Progress in the Collieries

Since the Organization of the Empire Steel Company when it became known that old collieries on the eve of closing were to be continued, great changes have taken place. Collieries are now being remodelled for larger outputs; underground airways and travelling roads are being repaired and put in first class condition; a Safety Department, officered by experienced men, with a live man at the head, has been organized to prevent accidents. But the opening up of new collieries, the remaking of others, the repairing of airways and the putting in of riding raikes cannot be done in a day and McLachlan known that this could not have been done at all if the organization of the British Empire Steel Corporation had not taken place. McLachlan alone refuses to do anything but damn a corporation which had it been organized years ago, would have prevented the expenditure on capital account of many millions of dollars and would have operated every colliery on the island to full capacity instead of having them crippled and cribbed in by boundary leases everywhere.

Not satisfied with mis-tating the facts as to the condition of Glace Bay collieries, Mr. McLachlan goes about to place the coal industry of Canada in a most unfavourable light. He states that they are the worst governed collieries in the world, and have the highest accident rate. But here again he perverts the truth, for Canada has a smaller accident rate than that of the United States as mentioned in the Canadian Mining Journal of May 19th. But what does McLachlan know of the conditions of other mining districts of Canada, and what had it to do with the case before the Board?

Giving further rein to his love of destructions, he goes out of his way to make a dastardly attack on the Mines Department at Halifax. He characterized that Department as antiquated, the Mines Inspectors as poorly paid, fifth-rate men, who failed to enforce the law. That the Inspectors were denied a chance to vindicate themselves and to state the conditions of the collieries which they supervised, was a gross injustice to them. Either the Board or the Mines Department should have insisted upon the evidence of the Inspectors. These men are faithful, hard-working, experienced officials, who would not for one moment permit any condition to exist such as was stated by McLachlan. Indeed these statements would never have been made before the Board if the attitude of the Mines Department in such cases had not been well known. Similar statements have been uttered again and again from free-speech platforms, where freedom is restricted to the pleasure of a howling mob who will hear no side of a question but their own. This kind of freedom, they label (or I should say *libel*) democracy. Until the miners of Nova Scotia come to understand that their business must be in the hands of sound, thinking men, men who are constructive, not destructive, they will never get anywhere. Moral reformers who believe they have discovered a fundamental weakness in the social structure and that it must be pulled down, whether anything else takes place or not, are not good leaders. Such moral critics, for a little cheap applause, would pull down the pillars of the earth if they could.

Thanks to the red-blooded men of Canada, the "reds" who abuse the privileges of free speech and free democracies are doomed to failure, with the terrible penalty impending of having to get down to work once more to earn a living.

PORT ARTHUR NOTES

By J. J. O'Connor

Dr. W. L. Goodwin, of the Department of Mines, Toronto, has completed two most successful Prospectors' Classes, one at Port Arthur, and the other at Fort William. The former had an average attendance of 23, while the latter was about the same. Many of those attending the Port Arthur course, also took advantage of the course held in Fort William.

These classes are highly instructive, and of prime benefit to prospectors in equipping them for work in the field. In addition to the classes held during the day, illustrated lectures were given in the evening, that were well attended by citizens, as well as, men engaged in prospecting. Dr. Goodwin's well-known facility in imparting his widespread knowledge of the geology and mineralogy of Northern Ontario, was highly appreciated by the attendants, and is certain to have its reflection in this year's field work.

Not in twenty-five years, has the outlook for general mining activity been so bright, as it is at the opening of this season. Mining operations are being carried on at the Lake of the Woods, in the Manitou district, where the stamps of the Laurentian mill are dropping, at Sturgeon Lake, Minaki area, Wabigoon Lake, and active prospecting and investigation in the Island Falls district; while at Schreiber, the McKellar-Longworth, and the Jackson properties are being actively and agressively developed with splendid prospects of satisfactory results. The old Empress Mine at Jackfish, east of Schreiber, has been dewatered, and it is expected to be in operation within a short time. Further east, at Goudreau, results are being obtained in the development of the Goudreau Gold Mine, that are exceeding all expectations in the richness of the ore that is being encountered. It is stated, $50,000. in gold was taken out of the first 55 feet of No. 1 shaft.

These operations cover an area over five hundred miles in length, with extensive mineral-bearing areas intervening, mostly unprospected and unknown. When the attention that is their due is given the areas, they may reasonably be expected to contain mineral deposits of economic value.

Gold, for the moment, is the fashionable metal with mining men and prospectors, and exceptional attention is being paid to the gold-bearing areas this season. We may now hope for modern methods, applied by experienced mining men, who do not conceive it to be the first duty of a mining company to erect a stamp mill before developing the mine, as was done in the past, resulting in the erection of 26 stamp mills between Port Arthur, and the Lake of the Woods, when there was not enough ore developed to supply a tenth of them. When intelligent mining methods are applied, this part of Ontario may be expected to give a good account of itself, and redeem it reputation. The interests that are now directing their attention to this part of the Province, are of the class that will give this section an opportunity to advance.

The Southern Rhodesian gold output for March 1922 amounted to 54,643 fine ounces as compared with 51,422 fine ounces for February 1922 and 31,995 fine ounces for March 1921.

British Columbia Letter

Mining Convention at Nelson

The International Mining Convention to be held at Nelson, B. C., from July 3rd to 7th promises to attract representative mining men from all sections of the Pacific Northwest. A tentative programme has been drawn up, which sets Monday, the opening day, for inspection of mineral exhibits and manufacturers' displays. Tuesday is to be "American Day" in connection with which there will be some special features in honour of American visitors and for the observance of the July 4th celebration. S. S. Fowler of Riondel will preside, and Lieut.-Governor W. C. Nichol will formally open the Convention. Our "Dominion and Provincial representatives" is the subject of an address to be delivered by Mayor C. F. McHardy to which Governor Elcott of Oregon, and J. B. White of Spokane will respond. An address is to be given by T. A. Rickard, of the Engineering and Mining Journal-Press, on "English-Speaking People". There will be lectures on Kootenay mining and smelting on Wednesday, while Thursday will be "Prospectors' Day". Hon. Wm. Sloan, Minister of Mines, will speak on "British Columbia's Mineral Resources and Industrial Progress." The Provincial Government is co-operating in a number of ways, notably by the preparation of moving pictures, illustrating the mining industry of the Province. These will be shown during the Convention.

Smelter Accepts Zinc Ores

The acceptance by the Trail Smelter of the Consolidated Mining and Smelting Co. of zinc ore already is having a marked effect on the industry of the Slocan district. The Whitewater Deep mine will resume operations on its zinc-silver property immediately. The Lucky Jim mine, which has been idle for some time, is also expected to be producing early this summer. Generally speaking there is a revival of interest and many properties that have been out of operation owing to the penalties against zinc and high labour cost are expected to be back on the shipping list before long.

Trout Lake

It has been reported that the Mining Recorder's office at Trout Lake, B. C. is to be removed, the official business to be handled by Government officials in an adjacent Mining Division. The mining men of the district do not like this idea, and are vigorously protesting. They point out that there is considerable mining in their particular section, and judging from news received from that part of the country these contentions seem to be justified. Among activities reported from Trout Lake district are the following. Mrs. Jowett's claims, "Foggy Day", have been bonded by a Spokane syndicate who will begin work on the 1st of July. The Ethel Mining Company of Spokane announce that work will be started on the "Nettie L." as soon as the snow leaves. James Livingstone is developing the "Copper Chief". It also is reported that there will be development during the season on the "Okanagan," "Silver Cup," "Bad Shot" and "Noble Five."

Alice Arm

The Silver Bar Mining and Development Mining Co. Ltd. has been organized in Vancouver, B.C., for the purpose of developing some of the mining prospects of the Alice Arm District, Northern British Columbia.

Some fine specimens of high grade sulphide silver ore have been brought from the Black Diamond Group, Alice Arm. The owner says that he has a well-defined vein which increases in width with depth. It is the intention to continue development during the summer.

A small vein of high-grade ruby and brittle silver has been found in a rock quarry, a short distance from the town of Alice Arm. The quarry is being operated by the Government to supply rock for public works. These showings are to be developed later on.

Mining men and Prospectors of the Alice Arm district are in difficulties because of lack of transportation up the Kitsault valley. The Dolly Varden Railroad has been closed down and the Company does not appear to be prepared to maintain a service this season. The Provincial Government has been asked, it is understood, to take such steps as are necessary to provide the operators of this section with the means of transporting supplies and ore from mines and prospects to tidewater. There is no present indication of how the problem is to be solved.

Premier

Mr. H. A. Guess, Vice-President of the American Smelting and Refining Co. and a prominent officer of the Premier Mining Co., passed through Victoria recently "en route" to the Premier Mine, Portland Canal Mining Division. It is his intention to inspect the Premier Mine and plant and other properties in that locality. The suggestion is made that Mr. Guess may consider proposals that have been made to his company for the purchase of prospects adjoining the property of the Premier Mining Co.

The Roseberry-Surprise mine, Slocan District, is employing about 20 men and shipping ore at intervals.

Major Angus Davis, before his appointment to the position of Resident Mining Engineer, Kamloops, is said to have examined the MacAllister group operated by the Slocan Mining and Development Co. R. A. Grimes is in charge of these operations. Major Davis is reported to have recommended the driving of a lower tunnel to prove the ore body at greater depth. Mr. Grimes is installing a compressor and proposes beginning development along these suggested lines.

G. D. B. Turner, a well-known western mining engineer, has left for Stewart, B.C., to direct operation on the Dunwell Mines, Ltd., and the Indian properties, Portland Canal Mining Division. He will have personal charge of the work on these properties during the summer.

The Exchange group of mineral claims, situated between the Indian and the Bush with the Premier to the south, in the valley of Cascade Creek, is reported to be showing up extremely well. Some samples carrying high values in gold and silver have been brought from this property.

C. B. Hosmer, of Montreal, has been elected vice president of the Consolidated Mining and Smelting Co., in place of George Summer.

Operations are to be resumed at the Cork Province Mine under the management of W. Y. Williams, formerly superintendent of the Granby Company's Boundary Mine. The mine has produced silver-lead ore to the value of more than $170,000, all of which has come from stopes above the 300 ft. level.

The erection of a cyanide plant is contemplated by the Bullock Gold Mines, Ltd. The Mine is situated on Poplar Creek.

R. H. Stewart, who has been in Texas for some time in the interest of the Thompson Aldridge Co. of New York, has returned to British Columbia, and has been examining properties at Sandon.

L. A. Dodd, who are been Gold Commissioner at Barkerville, B.C., for some years, has been transferred to Nanaimo, B.C.

The Nickel Plate Mine near Hedley, one of the largest gold producers in British Columbia, has resumed operations after a lengthy period of inactivity.

G. S. Blaylock, for many years General Manager of the Consolidated Mining and Smelting Co. has been elected a Director of that Company.

The operations of the Tidewater Copper Co., Sidney Inlet, west coast of Vancouver Island, are of unusual interest. The Company is using nothing but water power to provide power for mine and mill. It is mining and milling its ore at a cost of only $2.10 per ton. It is making a recovery of 95 p. c. of the copper content of its ore, and is producing a concentrate running between 35 and 40 per cent. of copper.

The semi-annual examination for Assayer's Certificates was held last week under the auspices of the Provincial Bureau of Mines, Victoria. There were two candidates, both of whom were successful, viz., J. D. Boulding and G. S. Rogers.

Ore Receipts at Trail

For the week ending May 7th, there were received at the Trail Smelter of the Consolidated Mining and Smelting Co. 7,944 tons of ore for treatment. The Company's properties contributed 7,603 tons, so that there were custom shippers to the extent of over 600 tons. The Florence Mine at Princess Creek shipped 32 tons of lead ore, while the Standard at Silverton sent 127 tons of zinc ore. Other independent shippers were: Mollie Hughes, New Denver; 15 tons; Paradise, Lake Windermere, 48 tons; Silversmith, Sandon, 76 tons; and the Black Rock, Northport, 43 tons.

Galena for Radio Apparatus

Scientific advances in connection with radio work, and the growing popularity on the American Continent of radio broadcast services, are likely to open to mining men of British Columbia a new market for a certain type of ore which, it is possible, is to be found in the Province in considerable quantity.

The mineral combination that radio men want is commonly termed "steel galena." This is a lead sulphide of a peculiar crystalline form. A sample of what is in demand was forwarded recently to the Provincial Bureau of Mines. In appearance it is a very fine-grained ore and the piece that reached the Bureau was very nearly pure galena with practically no impurities, assaying 86 per cent lead.

This foreign specimen was compared with specimens of number "steel galena" of British Columbia as shown by the Bureau's Mineral Exhibit. Some local samples were found of high standard and it is understood that as a result, New York interests now are making investigations with a view to ascertaining whether the supplies of which they are in need may be obtained in this Province.

There is some promise of an important market being developed for the product of some of the mines of this Province and the outcome of investigations now in progress will be watched with interest.

GOOD REPORTS FROM PAS MINERAL BELT NORTHERN MANITOBA

By Reece H. Hague

With the recent opening of navigation between The Pas and the mineral belt, excellent reports have been received from various properties on which work is under way, and considerable activity is anticipated this summer throughout the whole belt from Herb Lake to Elbow Lake.

Elbow Lake

On the Murray property at Elbow Lake the Hollinger interests have stripped the ore-body and carried out extensive trenching. Test pits are now being sunk and everything is in readiness for sampling and assaying at the plant that has been established on the property. Visible gold is said to be distributed freely throughout the trenches and in the pits over a large area, and the ore body is expected to carry high and uniform values. Other finds are reported from the same district, extending through Island Lake, Claw Lake and Barb Lake.

The Exploration Company Ltd., of London, England, have a staff of men engaged in trenching the Hanna and other gold bearing properties at Elbow Lake, operations being under the supervision of A. Walza, mining engineer of New York, who has taken the place of Walter A. Ru-Keyser, called to New York on the death of his father.

Diamond drilling is in progress on the Gordon property at Copper Lake, which is under option to the Nipissing people. Mr. Gordon left for his property with the first open water.

Herb Lake

Men engaged on the Bingo prospect at Herb Lake report a new discovery which promises to be more important than the other veins previously known to exist. The latter carried high values in gold and were favorably reported on by Professor DeLury of Manitoba University.

Herb Lake, which was the first gold-bearing district to be discovered in Northern Manitoba, may yet prove a factor in the gold production of the Dominion. Discoveries there include the Bingo, Rex, and Northern Manitoba, on all of which attractive ore has been found.

The Bingo Company was recently reorganized in England with the Earl of Hardwicke as chairman of the board of directors. A 90-foot shaft was sunk on the property some time ago, and the veins strengthened at depth and values improved. The new vein discovered is said to run parallel with the others and to be from three to six feet in width. If this proves up it should enhance the value of the property considerably.

The Pas mineral belt will receive such an overhauling by prospectors and mining engineers this summer as it has never before had. Every boat is taking fresh parties out and mining men in the district are hopeful that the next few months will see many more finds of importance. The district has hardly been scratched, up to the present, and the majority of finds have been more or less stumbled upon. Prospectors have confined their prospecting to the lake shores but intend to defy the flies this summer and go inland.

The Transvaal gold output for April 1922 amounted to 511,338 fine ounces, as compared with 681,382 fine ounces for April 1921.

Northern Ontario Letter

Power Development not yet Assured

Just at a time when assurance of the right to develop power on the Abitibi River appeared probable for the Hollinger Consolidated Gold Mines, something unforeseen seems to have developed and this question is still uncertain. Despite the conferences held between representatives of the largest interests in this part of Northern Ontario, no official statement has ever been issued in respect to the final result; and in the meantime, an official of the Hollinger has stated to the Journal correspondent that there is still some uncertainty about the matter.

Gold Centre

British and American capital is being interested in the Gold Centre property, situated in that part of the Porcupine field lying between the Dome and the Hollinger-McIntyre areas. W. E. Simpson, manager of the Miller Independence Mines of Boston Creek, will have charge of the operation.

Mill for Clifton-Porcupine

Arrangements are being made to erect a 15-ton mill on the Clifton-Porcupine property. It is believed such a mill will result in sufficient production to pay for the further development of the property.

The shaft on the Paymaster property is to be continued to a depth of 400 feet. Results have been encouraging on this property.

Progress at V. N. T.

A special visit to the Porcupine V. N. T. Gold Mines by the representative of the Journal found mining operations in full swing. Not only is the work of sinking the shaft from the 600-ft. level under way, but drifting operations are being carried on in the big ore body at the 600-ft. level.

N. J. Evered, general manager, stated that the dewatering of the mine was accomplished in about two weeks and at a remarkably low cost. He said that the underground workings, including timber, were found to be in excellent condition and that rapid progress is assured. A total of five machines are employed and the shaft will be pushed to a depth of 900 feet. A station will be cut at a depth of 750 feet, but lateral operations may not be undertaken at that point until the 900-ft. level is reached.

In addition to these underground operations, a diamond drill machine has been employed and is now actually at work, exploring that area lying between the main vein and the boundary of the adjoining Hollinger Consolidated.

Night Hawk Lake

Interest is keen in the territory lying along the north east shore of Night Hawk Lake, in th Porcupine Mining Division, some fifteen miles north east from the producing section of the Porcupine district. The outstanding success on the Night Hawk-Peninsula Gold Mines has encouraged widespread interest.

Among those who are identified in exploring and developing property in the Night Hawk district are a group of prospectors and business men of South Porcupine who have secured claims along the strike of the proven ore bodies. This syndicate has completed arrangements to employ a diamond drill for the purpose of locating, if possible, the mineralized area. The properties are reached by boat from Connaught station on the Porcupine branch of the T. & N. O. Railway.

McIntyre Mill Enlargement

The new milling unit on the McIntyre-Porcupine will be ready for operation by June 20th, and will increase the capacity of the mill to between 750 and 800 tons daily, as compared with a present limit of about 550 tons daily. This increase was to have taken place this week, but unforeseen delays occured in placing foundations as well as in slow delivery of some of the equipment.

A feature of the recent development work on the McIntyre has been the discovery of a porphyry intrusion at depth which does not show at surface. This has altered the course of one of the main ore bodies in such a way as to throw it over on the west claim of the McIntyre,instead of passing across the boundary on to the Acme side of the Hollinger. This indicates that the McIntyre will have nearly a quarter of a mile more in length of vein than had been formerly counted upon The development is one of importance.

At the present time the McIntyre is employing approximately 360 men, and the ore outlet system has reached a high state of perfection, thus assuring full tonnage with which to operate the enlarged plant at full capacity. Beginning with the new fiscal year on July 1st, next, the McIntyre may be expected to produce approximately $10,000 daily, or at the rate of about $3,500,000 annually.

Developments at a depth of 1,875 feet are favorable.

Dome Reserves

With a force of 550 men and with approximately fifty machines operating underground, the work of developing the Dome Mines is now going on at a rate that eclipses any other period in the past on this mine. Large ore reserves have been blocked out at and above the 800-ft. level, and further big tonnages have been placed in sight at 1,000 and 1,150 feet. In addition to this, further sinking has been carried on and a station is now being established at a depth of 1,600 feet.

These details of progress at the Dome are official to the Journal. They show that in addition to the recent official figures about record production, the development of the mine is going forward at a pace that would appear to indicate an enlargement of the mill as the next necessary step for the Dome

The question of mill enlargement was mentioned to an official of the company, but no confirmation of a reported big addition could be secured It is considered not unlikely that Mr. Bache, president of the Dome, may make important reference to this at the forthcoming annual meeting of the company.

At any rate, production is now at a higher rate than was ever before considered possible, while the development work is far ahead of milling requirements All of this points to the possibility of the mine taking a place among the world's great gold producers

Shiningtree District Active

Activity is spreading throughout the whole of the West Shiningtree gold area This has been occasioned in part by the general wide interest in gold mining the world over and is in part due to the recent favorable results on properties in the West Shiningtree field itself

Arrangements have been made to carry on work at

a depth of 300 feet on the White Rock property, owned by business men of Sudbury. Diamond drilling is being carried on with good results on the Atlas property, while work is also under way on the Wasapika. A deal is pending for the Herrick property, and the underground workings are now being de-watered preparatory to being sampled by a representative of English capital. Contracts have been let for shaft sinking on the Kingston property, while a force of men is now engaged in exploring the surface of the Hologden Mines preparatory to carrying on underground work.

Shakespeare Mine has Changed Hands

The old Shakspeare Mine, situated south-west of Sudbury, has been secured by Mr. Calvin of North Bay. The property was worked in the years 1905, 1906 and 1907 with encouraging results. A shaft was put down 300 feet and a small stamp mill was installed. Some $38,000 in gold was recovered during the short period of operation of the mill.

Information from the Ontario Department of Mines with reference to the Shakespeare is as follows:

"The ore is made up of interbanded lenses and stringers of quartz and chlorite schist. The contact with the granite lies to the north on the other side of the valley, probably half a mile away. The lode is 40 feet wide, having an ore zone on either side. Iron pyrites is the principal sulphide. A shaft with several levels has been sunk to a depth of 300 feet or more."

Newray

Having acquired a working option on the Newray Mines of Porcupine, whereby it will be possible to secure control of the enterprise, the Coniagas company of Cobalt will carry on an extensive campaign of development. It is probable that the minimum expenditure of $4,000 a month will be far below the amount that will actually be spent during the currency of the option. An official of the Coniagas declared that preliminary work would commence immediately.

One of the leading mining men of Porcupine who is familiar with the Newray was interviewed and expressed the opinion that the potentia ities of the property are second to none in the Porcupine district with the exception of the present producers. It is well known that high-grade ore occurs in patches, while there is a substantial tonnage that contains about five dollars per ton in gold. With these showings and with favorable geological conditions, the outlook is regarded as being very favorable for the Coniagas company extending its mining activity for another long period of years thro g'i its acquisition of the Newray.

Considerable prospecting is being done in the township of McArthur, on the strength of last winter's discovery of ore in which gold, platinum and silver occur. Prospectors who went in with canoes early this spring by way of the Mattagami and Grassy rivers are expected out at an early date and will bring with them additional samples and a more detailed description of the new prospects.

According to information just obtained here, the old Golden Rose property near Emerald Lake, in the Temagami Forest Reserve, has been purchased by Oscar Smith, of the Smith and Travers diamond drilling firm. This is the second time for the property to change hands during the past few months, Mr. Sweeny of New York having acquired it only a few months ago.

Those behind the work of developing power on the Montreal River at Indian Chutes are confident of being able to complete the work by the end of the current year. It has been estimated that about 3,000 h. p. will be developed.

A meeting will be held at an early date when the shareholders of the Frame-Porcupine Mines will be asked to ratify a deal whereby the property shall be sold to another company which holds seven mining claims in the Porcupine district. No details of the proposition have so far been announced, although the intimation of the purpose of the forthcoming meeting has been obtained through official circles.

Although early action was expected by the O'Brien Mines in connection with enforcing the advantages gained in the recent court decision against the La Rose Mines, yet nothing so far appears to have been done. The La Rose has a limited time within which to take the case to the Privy Council, and it is believed that this course will be pursued.

Assessment Work on Mining Claims

Late advice that the Amendment to the Mines Act of Ontario passed its third reading, without any provision for the protection of old claimholders, is just to hand in the mining district of Northern Ontario. The situation is that shortly after Hon. H. Mills was made Minister of Mines, he proceeded to modify the working conditions by reducing the total amount of work to be done on mining claims. This was done in face of considerable opposition and criticism. It now develops that the Minister has recognized the folly of the change and has now put through a bill which wipes out the changes brought by himself. The unfortunate feature of the situation is that with the old drastic working conditions again in force, those who recorded mining claims during the past couple of years under the Mills regulations are confronted with the fact that under the new conditions they are behind in their assessment duties and without time to do it before date of forfeiture.

Advertisements other than "Employment Wanted" or "Employees Wanted" will be inserted in this department at the rate of 20 cents per agate line (14 agate lines make one inch). $2.80 per inch, each insertion, payable in advance. Space measured from rule to rule. When four or more consecutive insertions of the same advertisement are ordered a discount of 25 per cent. will be allowed.

Advertisements of "Wanted Employment" or "Wanted word, net. Cash must accompany order. If box number is used, enclose ten cents extra for postage in forwarding replies. Minimum charge 50 cents.

Employees" will be inserted at the rate of two cents a

FOR SALE — 40 H.P. Locomotive type boiler, 18 H.P. Vertical, 95%, new, bargain price. 66 Ottawa Street, Montreal.

FOR SALE

Complete Mine equipment consisting of:—
2 — 60 H.P. Portable Boilers Complete,
1 — Donkey Boiler with Hoist,
1 — Hoist.
1 — 3 Drill Steam Compressor.
1 — 8 x 8 Belt Driven Compressor.
1 — Electric Lighting Outfit complete.
1 — 10 Ton Capacity Holt Tractor.
1 — Leyner Drill Sharpener.
1 — 10 x 16 Farrell Crusher with Screens.
Pumps, Drills, Stoppers, Mining Equipment, etc.
Laboratory outfit with small crusher, glass ware, balances, etc
Above installed only short time and in good condition.
J. G. SIPPRELL, B.Sc., Engineering Equipment, Bedford Chambers, Halifax, N. S.

EDITORIAL

We owe almost exclusively to the exploratory work of the Geological Survey of Canada our knowledge of the more remote and inaccessible parts of our Dominion, and its work indicates those portions of our hinterland which are especially worthy of attention on the part of the prospector and the capitalist interested in mining.—F. D. Adams — 1912.

"THE WRONG WORD"

An eminently readable article by Mr. T. A. Rickard appears in the May 27th number of our contemporary, the *Engineering and Mining Journal-Press.* It is entitled *"The Wrong Word."*

Mr. Rickard impales upon the point of his flashing lance misusers of the King's English. As a happy, though unquestionably apocryphal, illustration he quotes the Chicago lady who expressed her delight at having heard "the French pheasants singing the mayonnaise."

The article (which, we believe, is a chapter from a new book on technical writing) gives instance after instance of the wrong use of unoffending words and phrases. But Mr. Rickard strikes a higher note than the advocacy of mere verbal accuracy. His concluding sentence is, "Without sincerity, the words of a man are as sounding brass or tinkling cymbal."

Nevertheless, for the sincere and insincere alike, the right use of words is a matter of very great moment. Strange as it may seem, college graduates are the worst offenders against the laws of usage and good taste in writing. Probably the cause of this is the fact that a college course extends their vocabularies faster than it develops their powers of assimilation. On the other hand, the organic literature of our race has been enriched by the writings of many men who never listened to a lecture within college walls. We do not, however, conclude from this that a college training necessarily unfits a man for good writing.

It is our opinion that no school or college training can take the place of continuous reading. He who aspires to write well must have an intimate friendship with good books. Today the splendours of English literature are accessible to all. But it is ordained that the man who will not explore for himself, cannot gaze upon these splendours.

Mr. Rickard is fighting a good fight. We hope that in his forthcoming volume he will emphasize most strongly the need of a wholesale revision of present-day literary dieteties.

A MARKET FOR ELECTRIC POWER

One of Canada's chief assets is her abundant water power, capable of development at moderate cost. We are now in the midst of a period in which the development of these water-powers is progressing by leaps and bounds. The materials and machinery for this development of hydro-electric power are now almost entirely made in Canada — a very satisfactory state of affairs.

The development of water-powers is a direct and comparatively simple class of engineering work, in which the natural conditions can be definitely gauged, the artificial works designed to suit, and the cost definitely calculated beforehand (the last in spite of recent events at the new Chippewa plant!). The market for the resulting power is less subject to control and to definite pre-determination, but there is hardly likely to be an over-development of hydro-electric energy such as there has been in the field of railway-building. The publicly guaranteed bonds, bonuses and land grants that attracted speculators and adventurers in the latter field have no parallel in the building of power stations.

At any time, and particularly at this time, we wish to turn our natural resources to account by creating usable wealth. Here we have a resource whose use can be extended quickly and without undue expense to many times its present capacity — provided a profitable market can be found for the electric energy. This is where the mineral industry comes in.

In the Montreal *Gazette*, a correspondent recently advocates the imposition of a duty on refined copper, in order to stimulate the building of refineries on this side of the border. At present, he states, Canada produces from her mines more than sufficient copper for her own use, but most of this is exported to the United States as concentrate, matte or blister copper, and imported again in the refined state. If a reasonable duty on refined copper will prevent this double transfer of our native material by causing the erection of electrolytic refineries in Canada, this would seem to be a clear case for tariff intervention.

A tariff is, however, a weak support upon which to lean, and often it turns out to be a broken reed. Many electro-metallurgical works are established and successfully operated in Canada without artificial aid, but have been boomed many times over within the last decade. The plants at Shawinigan Falls, Quebec, are an outstanding example of this fact. From the simplest of raw materials they are made by aid of the electric current a marvellous diversity of products. Limestone produces quicklime, calcium carbide, acetylene, acetaldehyde, acetic acid and acetone, and the innumerable chemical derivatives of the last two. Quartzite and scrap iron give ferro-silicon. Manganese and magnesium are reduced from the corresponding

oxides, raw material for the former having still to be imported.

In each of these cases rock material that is absolutely or relatively cheap is converted into a highly valuable chemical, metal or alloy, with the electric current as the chief or the sole agency. Research is constantly adding new processes of this sort to the number already established.

Electro-metallurgical plants are good customers of the power plants, as they consume power in large amounts and ordinarily, at constant load. Other such plants can use off peak power, obtainable at reduced rates, and so almost confer a favour on the producers. In this connection it is interesting to note the recent development at Shawinigan of an electric steam generator, which utilizes off-peak power to make steam at less cost than it can be produced by burning coal.

Bearing these various points in mind, we may reasonably expect a continuous and rapid development of the use of Canada's hydro-electric power for the conversion of the products of her mines and quarries into merchantable commodities.

AN OPTIMISTIC ENGINEER

Dr. C. V. Corless, in the June *Bulletin of the Canadian Institute of Mining and Metallurgy*, gives a clear and reasoned reply to the recent criticism to which his optimistic public utterances have been subjected by Mr. C. M. Campbell of Cassidy, B.C. In this letter to the *Bulletin*, Dr. Corless puts his finger upon what constitutes the point over which he and his fellow-member of the Institute disagree. Both are completely sincere in their conclusions, and both have been working hard on this subject, in a disinterested way, and purely for the public benefit. Their difference is due to their having adopted dis-similar points of view.

It is usually the rôle of a geologist to project his ideas far into the future, and to venture prophecies as to the discovery, growth and decline of mining regions in the decades to come. The engineer seldom allows his speculative thought to travel far beyond his own mine, or at most his own camp; for he is bound by the ties of money, and must hold himself strictly accountable for any predictions of ore reserves or of future production that he may make.

Thus there are two trends of thought, which in the ordinary case cannot be allowed to mix with safety.

Mr. Campbell speaks as the operator. He cannot allow ore to be included in estimates until it is put in sight by one of the approved methods. Speculative reserves are not good practice, and are liable to "come back" on the unwise prognosticator. This is sound, and should ever be kept in mind by the engineer.

Dr. Corless has been an operator, too, and has made his close and canny estimates of what his mines will produce for him. But now he has of necessity become more a student of men and affairs in general; it is his main concern to study history and the present trend of events, and to build for the future. It is this habit of mind that has led to the conclusions he has expressed as to Canada's ultimate capability of mineral production.

It is only fair, in following the discussion of the two sides of this question by two eminent Canadian engineers, to examine into the point of view of each; else we will mistake both the meaning and the motives of both. Each has something valuable to offer to the reader.

THE VALUE OF MINERAL COLLECTIONS

The recent announcement that the University of Manitoba has established an extensive museum of mineralogy and economic geology brings to mind the importance of such collections. In this case Mr. W. F. Ferrier, who has a fine instinct for the collecting and arranging of mineral specimens, was retained for the purpose of instituting for the University of Manitoba this important part of its educational equipment. Mr. Ferrier's wide professional and personal acquaintance has resulted in the gathering together during the past winter of specimens from the four quarters of this continent, as well as many from beyond the seas. The old-established universities have been generous in their assistance to their younger sister.

The recognition of minerals in the field is, more than any other thing, dependent upon comparison with samples previously examined. There is such an infinite variety in the appearance of common minerals (not to mention rarer varieties) that the wise mineralogist is seldom willing to commit himself on the strength of appearances only. The only way in which to gain a familiarity with the minerals is to gaze at them, handle them, "paw them over", conduct the simple field tests innumerable times, until a reasonbly close acquaintance cannot be in doubt. But one must beware of too much dependence upon particular specimens; one may examine a hundred pieces of the same mineral, and each may be different from all the rest.

The more numerous museums of mineralogy and public exhibits of minerals become, the more rapidly will the public become acquainted with the facts of the mining industry. This has been repeated time and again; but as yet it has been insufficiently heeded in a practical way. We have a growing number of public exhibits of minerals; but more often than not insufficient explanation is accorded to passers-by to make the exhibit intelligible. This fault can be remedied with a little careful labelling and brief written notes, as is done, for instance, in every art gallery.

During the past year, the Ontario Department of Mines has had placed in numerous Mining Recorders' offices, collections of minerals and rocks representative of each of the localities. The specimens thus made available to prospectors for reference should prove a valuable aid to these pioneers. This idea is worthy of adoption throughout all the mineral districts of Canada. Thus the office of each Recorder, or similar official, might become a centre of distinct educative influence, in addition to its present functions.

Another systematic effort to make the prospector familiar with the minerals for which he is searching, and the rocks that contain them, is the prospectors' classes conducted by the Ontario Department of Mines. A feature

of these classes is that each one attending is presented with a collection of over seventy-five minerals and rocks. These specimens are enclosed each in a separate envelope on which is printed information regarding the mineral or rock — its occurrence, value and physical features, and simple field tests.

A good deal is being done at present to help the development of our mineral industry by means of collections of mineral specimens; but much remains to be done before full use will be made of this simple and most effective device for instruction.

EDITORIAL NOTES

The Journal registers today one more point in the optimist's score. Mr. C. B. Dawson's brief description of the lead-zinc deposits he has opened up on the shore of Great Slave Lake has more import than would appear at first glance. We have not been accustomed to consider the mid-continental plain as capable of any but non-metallic mineral production. Here, on its northern rim, is announced a prospect that already shows up one million tons of thirty per cent. lead-zinc ore. Mr. Dawson's laconic account of his work is characteristic of the genuine engineer — the man that does much and says little.

Dr. Morley Wilson's brief memorandum on the Madoc talc deposits is a small item in a large bit of work in which he is at present engaged—a detailed study of the Madoc district, Hastings county, Ontario. This area has long been known as a veritable store-house of minerals, many of them rare; but not until Mr. G. H. Gillespie organized the mining and milling of talc was there any consistent mineral production. The stimulus of war prices resulted in a substantial output of fluorspar, which has since declined to zero. Systematic development under normal conditions might result in a profitable fluorspar production. Meantime Dr. Wilson's studies, both scientific and economic (and who can say which is which?) will provide the best possible means for making the district consistently productive of a maximum of mineral wealth.

Labour troubles and Government taxation are intensifying the difficulties of mine owners and operators in Australia. The coal miners of New South Wales are particularly restless. A manifesto issued lately by the Coal Miners' Federation announces that the miners are prepared to take over the mines to show "capitalistic society" what real efficiency is, and to pave the way for the "classless society" of the future. Labour is prone to overlook the patent fact that its own ranks are very decidedly "classified" by union organization. "Classless" communities do not exist, will not exist, and cannot exist on this oblate spheroid until such time as the Powers in charge of our destinies shall have standardized each and every brain-pan and its contents.

A NEW SOURCE OF SOAPSTONE IN ONTARIO

Mr H. S. Spence, of the Mines Branch, Department of Mines, Ottawa, examined, last October, a deposit of soapstone near Dryden, Ontario, that gives promise of being of economic importance. His report is not yet published, but a memorandum has been issued giving the main particulars.

Though only a small amount of shipping has been done, outcrops show the deposit to be large. There are two bands of the rock, separated by about 100 feet of a gritty rock. One band is 35 feet wide and at least 500 feet long, the dimensions of the other have not been determined, but it is probably larger than the first.

The quality of the soapstone seems to be uniform throughout the deposits. The structure is not schistose or foliated, as is commonly the case, but massive. Chemical tests show an unusually pure soapstone. Mechanical tests are satisfactory even on weathered surface samples. Fusion tests show that the rock is superior in refractory quality to "alberene stone", a standard variety from Virginia.

As the soapstone composes a low ridge near the shore of Wabigoon Lake, and is distant only 500 yards from the Canadian Pacific Railway, it is most favorably situated for shipment.

The main use suggested is for bricks for the lining of the smelting furnaces of sulphate pulp (kraft) mills. There are more than a dozen of these mills in Canada, and the soapstone bricks for these, of considerable amount in the aggregate, are all imported from the United States. Other suggested uses are for bake ovens, fireless cookers, etc. where the heat retaining use of soapstone is used to good advantage.

1 MILLION

(As with most of these fugitive verses, the following is based upon actual experience on a mining camp. The sudden acquisition of a million is often disastrous.)

O! I saw him on the morning that he got his million cold
And perhaps he wasn't normal, but he didn't act the fool
He was just a bit uneasy, so I didn't say a word,
But I acted quite as natural as if nothing had occurred

I must say that I was anxious that he shouldn't lose his head,
Or attempt to start a riot. Let puter type to be dead.
Being proud, I merely nodded as I wandered on my way,
And refrained from talking to him—thought he'd come to me some day,
did I say

You are welcome to your millions, I am happy as I am.
And I wouldn't share them with you. My, it's wonderful
was, Hot damn!
For the million that he'd garnered wasn't in the form of
wealth.
But those little wrinkles 'round his eyes, or was it
stealth?

ANON

Talc in Canada*

BY M. E. WILSON

Deposits of talc or soapstone occur throughout Canada in Nova Scotia, in British Columbia, in the Eastern townships of Quebec, and in southeastern Ontario, but most of these, so far as development work has shown, are either limited in extent or impure, so that the only extensive known deposits of highgrade talc in Canada are those occurring in the vicinity of the village of Madoc, Hastings County, Ontario.

Geology

The rocks with which the Madoc talc deposits are associated consist almost entirely of dolomite, quartzite, and interlaminated quartz and dolomite (called Eozoon by the early Canadian geologists); but batholithic masses of granite occur nearby. On the Henderson property several dikes of luxullianite, a rock consisting chiefly of brown tourmaline, have been cut. These range from 2 to 8 feet in width.

Deposits

There are 3 properties in the Madoc district from which talc has been produced, the Henderson Mine, lot 14, Concession XIV, Huntingdon township, owned by the Geo. H. Gillespie Company of Madoc; the Connolly, lot 15, Concession XIV, Huntingdon township, owned by the Anglo-American Talc Corporation now the Asbestos Pulp Company Ltd.; and the Eldorado property, lot 21, Concession V, Madoc township, last operated by the Eldorado Mining and Milling Company.

Henderson Mine. — The deposit on the Henderson property consists of pale white to pale grey, flaky micaceous talc in which a few scattered crystals of pyrite and a small proportion of tremolite, calcite and dolomite are present. It occurs in a huge S-shaped mass from 15 to 60 feet wide and several hundred feet long, the form of the deposit being due to deformation of the drag-fold type.

Connolly. — The deposit on the Connolly property occurs as a lens 200 feet long and 15 feet wide at its middle. It is similar in character to that on the Henderson property and was probably originally a part of the same deposit, but has become detached as a result of the deformation to which it has been subjected.

Eldorado. — The deposit on the Eldorado property consists of an intimate mixture of talc, dolomite, and quartz. The deposit is extensive, at least 100 feet wide and several hundred feet long, but does not contain more than 25 per cent of talc, and is too low grade to be workable except possibly for roofing material or other products in which low grade talc is used.

Origin

The deposits are almost certainly of metamorphic origin and have apparently been formed from the dolomite member of the Grenville series as a result of the intrusion of the granite batholiths. The presence of the crumpled dikes of luxullianite on the Henderson property have an important bearing on the genesis of the talc deposits because these dikes were probably derived from the granite batholith that adjoins the property on the south, and indicates that the talc or the material from which the talc was derived was subjected to high temperature conditions at the time the batholith was intruded.

Henderson Talc Mine (foreground) and Connolly Mine and Mill (in the distance). Madoc, Ontario.

* Published with the permission of the Director of the Geological Survey of Canada.

Memorandum prepared in answer to an enquiry regarding the talc deposits of Canada.

ONTARIO'S NATURAL GAS IN 1920

The rock strata of Ontario have afforded us no solid fuel; but in the southwestern peninsula this lack is compensated in some degree by the supply of natural gas. The failing supply drew public attention, in 1919, to the fact that this resource is far from inexhaustible, and in 1920 the office of Commissioner of Natural Gas was created, with power to control and coördinate the use of this fuel with a view to its conservation. That Mr. E S. Estlin, the present Commissioner, has applied his powers judiciously and with marked effect, is shown by his annual report for 1920, published recently as Part 5, Vol. 30, of the Ontario Department of Mines.

The natural gas supply has been wasted in two ways; first, by actually allowing it to escape into the air, unburned, and by buring it uselessly; and second ,by using it where some other form of fuel would be more economical, from the point of view of national conservation. Both these forms of waste have now been checked to a noticeable degree, though the process of education upon which a complete cessation of waste depends will require a number of years to become effective.

The Prospector and his Prospect

(Written specially for the Canadian Mining Journal)

Giving advice to the prospector seems to imply two things: first, great wisdom and greater temerity on the part of the giver, and second, unenlightenment and eagerness to learn on the part of the prospector. Both implications are wrong. As the writer can lay claim to little wisdom and less temerity, and as prospectors are notoriously resentful of advice, the only excuse for this brief article is the desire of the writer to oblige the editor. I don't know that the result will please any body. "Howeffer!" as MacPhairson said when the camp missionary loaned him a tract on selective salvation.

* * *

First Work on the Claim

On the great majority of nearly-staked gold claims (I have chosen gold because it is the most sought for metal) preliminary work is wastefully misdirected. Naturally, no hard and fast rules can be laid down. Much depends upon the situation and topography of the claim, and upon the time and supplies and cash available to the prospector. The generality of cases will be covered if we suppose that the prospector and his travelling partner have a superabundance of time, are fairly well stocked with food supplies, and have a very small reserve of money that requires the most watchful husbanding. All these things being so, the prospector must now decide upon what he is going to do and where he is going to do it.

It is an easy enough matter, even in closely-wooded country, to make a rough compass survey of a small tract of land. A rough sketch plan of the property, not drawn to scale but displaying compass directions and accurate measurements of distances and major contours, is absolutely requisite. Sufficient time and pains should be spent upon this very simple task. It is essential for future reference and for the intelligent carrying-out of the opening work. I am sorry to say that such sketch plans are too frequently either not made or are improvised from the imagination.

Stripping and Cross-Trenching

A fairly workman-like plan being finished, the next step is to consider where stripping and cross-trenching can be done to best advantage. And here it should be remembered that the fact that you have two similar exposures, some hundreds of feet apart, is not proof that these belong to the same vein. Closer demonstration is needed. Hence as much time as can be spared should be devoted to studying the placement of work in relation to overburden, local topography, accessibility by future roads, fuel supply, water, permanent workings, etc. In short, the prospector should keep ever in mind the fact that sooner or later the property, if it prove up well, is to be inspected by representatives of capital My only excuse for writing this obvious platitude is that the prospector does very often seem to forget it entirely.

I think that prospectors and engineers alike agree with me when I say that the prime object of preliminary work is to expose the vein as continuously or at as frequent intervals as will make representative sampling possible. This being possible, it is a waste of time to attempt shaft sinking. Indeed, the misguided prospector needs this piece of advice. He seems to have an irrepressible yearning to dig deep holes. The yearning is atavistic; its results are works of supererogation. (Editor's note—If the printer doesn't mind, we don't.)

This being the case, attention should be focussed upon preparing the property for sampling and inspection. When there is only a light overburden, two men can do an astonishing amount of work. Should the overburden be heavy, part, at least, of the vein should be stripped at short intervals from the discovery and at as frequent intervals as the topography will permit thereafter. With heavy overburden, also, trenches and crosscuts should be carefully covered with brush to facilitate winter inspection and to keep the exposed surfaces clear of muck. Every trench and all stripping should be marked on the sketch plan.

Sampling

"Channel sampling" is a phrase that covers a vast amount of sloppy work. "Channel", "grab", and any kind of sampling may be utterly worthless and positively misguiding if it be not conducted with method and commonsense. By far the most important thing for the prospector to do is to make and keep a complete record of how, where and when he takes his samples, what the vein looked like at the spots where he took them, what the character and variations of the "mineralization", what the appearance of the walls, etc. etc. With these precautions taken, samples will have some meaning and the risk of future misunderstanding and discredit will be removed.

Window-Dressing

Human nature, unchanged and unchanging since Adam and Eve had their little misadventure in Mesopotamia (Editor's note:—We disclaim all responsibility for the writer's geography.) demands that careful watch should be kept over "show" specimens of ore. I have known of instances in Northern Ontario and Northern Manitoba where properties have been robbed of hundreds of dollars worth of spectacular ore. In not a few cases other properties, perfectly innocent of gold, have been sold with the aid of these show pieces. They seem to be as fatal a lure to the layman as is the "Silver Doctor" to our finny victims. And, of course, "specimen" ore has a meaning all its own, but it very rarely makes a mine; never yet has it made a mine in Canada. In truth, the best it has done has been to help in the development of prosaically low grade veins.

If the prospector keeps this in mind he will refrain from being carried away into the mephitic mists of high finance by the sight of "free" gold. His window dressing, therefore, should be conducted in the same spirit that inspires the shopkeeper to display his wares to best advantage.

Prospector and Purchaser

More sales of mining prospects have been blocked by the unreasonable demands of the discoverer than by any other cause whatever. That's the plain unvarnished truth. Few prospectors are salesmen. Nearly all are imbued with a transcendant faith in their own claims. Hence when the time comes for talking "turkey" to the purchaser, there is no common ground on which to conduct negotiations.

Now whilst without the impulsion of faith and hope the prospector would not prospect for a day or an hour, yet he should make due allowance for the other fellow. No one wishes to pay heavily for the privilege of spending more money, and this is what the prospector frequently expects the investor to do. On the other hand, the prospector probably [illegible]

If he, the prospector, by giving careful thought to what it will cost to open up, develop, and bring his property to the point of production, puts himself in a position to appreciate the purchaser's point of view, he will (supposing him to be a rational animal) make his demands proportionably reasonable. He has a right to insist upon a "forfeit" payment if an option is taken on his property. This is essential as a proof of good faith on the part of the buyers. But he certainly should be sweetly reasonable in his demands thereafter. In short, he should ever be willing to trust to the future of the property for a great part of his returns.

On the other hand, if the buyer is willing to pay cash down, I, if I were now a prospector, would sell Golconda, and the Inds, and golden Ophir for spot coin of the realm, at a fraction of their estimated value — and I would be well advised in doing so.

Whatever may be the faults and frailties of mining investors, it is certain that prospectors do not give them the consideration that is their due. If I have helped to correct this failing in the prospector, I shall be forgiven, I hope, for taking up so much space in doing it.

(Editor's Note:—It is only fair to the writer to state that he is not on our regular staff and is paid by space rates.) CAPRICORN

Lead-Zinc Deposits Near Great Slave Lake, Northwest Territory

By C. B. Dawson

Northern Alberta and that portion of the North-west Territory lying immediately to the north of it and around Great Slave Lake has, for a number of years, been a centre of interest to the oil prospector; but, with a few exceptions, no real search of the country for mineral deposits has ever been systematically carried out. The Government Geological Survey has done excellent work, but the area is so vast that much of it is as yet untouched and practically unknown geologically.

In 1914, a prospecting party was sent by an English Syndicate to examine the country near Great Slave Lake. This party staked a number of claims to cover some lead-zinc deposits they found about ten miles south of Pine Point, on the south shore of Great Slave Lake. As it was then late in the season, little work was done and the conditions arising from the War prevented a detailed examination until 1920 and 1921, when the writer, with a small party, did a considerable amount of stripping and test-pit sinking.

Location and Topography

The claims are situated in almost flat country, about 200 feet above Great Slave Lake, to which the descent is imperceptible, save at a point about two miles back from the lake where some low shaley limestone ridges provide a slight local relief. The country consists for the most part of sandy or bouldery plains, interspersed with swamps and muskegs and very low esker-like ridges of gravel or sand. The prevailing timber is Banksian Pine, with which is associated in minor amount white and black spruce, tamarack, aspen, balsam-poplar and birch. The soil is almost invariably poor and unsuitable for a heavy forest growth; but trees up to 9 inch butts are found in sufficient numbers to provide ample timber for general mining purposes.

Geology

The underlying rock of the district consists of dolomite (locally described as the Presqu'ile formation) belonging to the Middle Devonian. Judging by the few exposures between the claims and Great Slave Lake, this dolomite passes downward into shaley limestone and bituminous shale, which may represent the lower measures of the same phase of the Middle Devonian or the upper part of the formation below, namely, the Pine Point limestone.

The lead-zinc deposits so far discovered and covered by the claims occupy the eroded crests of what are considered to be low anticlinal folds. Their outcrop is characterized by sink-holes which, in the case of three of the four deposits, almost completly surround the ore and in general appear to mark its surface limitations. The visible sink-holes are obviously post-glacial in age. Whatever their origin, it would seem clear that there is some connection between their occurrence and the pyritous outer portions of the lead-zinc deposits. Their maximum depth below the general level is about 20 feet. Where the deposits are capped by barren dolomite or dolomite low in lead and zinc or by boulder-clay, the surface, apart from the sink holes, gives no indication to betray the occurrence of mineral deposits beneath. Where, however, the ore actually outcrops, there is no vegetation and the surface is covered by a crumbly gossan throughout which cubes of galena are thickly scattered.

The Ore Deposits

The metallic contents of the deposits are galena, sphalerite, marcasite and pyrite together with the oxidation products of these minerals. Oxidation was evident at the greatest depth reached in a prospect shaft, namely, 32 feet.

While the mineralization commonly follows the bedding planes of the dolomite, increasing and weakening horizontally, irregular lenses of ore cross the strata at every angle, and bunches of similar material occur irregularly throughout the dolomite. The knowledge so far gained would seem to indicate that the deposits are roughly circular or elliptical in horizontal cross-section, and that as regards mineralization, lead minerals predominate over zinc towards the centre, and at depth the galena and sphalerite become very intimately mixed.

The depth of the deposits is as yet unknown, but it is believed to be considerable and to be limited only by the depth of the Presqu'ile dolomite at the claims. Near the south shore of Great Slave Lake this dolomite is about 200 feet thick.

Sufficient data is not yet available to correctly estimate the ore so far developed; but a close approximation will place it in the neighborhood of one million tons, as determined by the prospect shafts. Channel assays taken from all parts of the deposits average 30 per cent. lead and zinc, with a silver content of 1.5 ounces per ton.

Transporation is the only hindrance to the immediate development of the property; but this is rapidly becoming better, and soon will present no serious difficulty. With the completion, recently, of the Alberta and Great Waterways Railway there is now direct communication between the rail centre of Edmonton and Fort McMurray, the beginning of the great water route to the Arctic Ocean. This water route, via Athabaska River, Athabaska Lake, Slave River, Great Slave Lake, and the Mackenzie River, gives, save for a sixteen mile portage at Fort Smith on the Slave River, uninterrupted communication to the Arctic Ocean, and three trading companies have small steamers plying between all points en route.

The New Mining Curriculum at Toronto University

By O. H. Boyd

Of recent months, much attention has been given publicly to an analysis of mining engineering courses in American Universities. The investigation has disclosed the fact that academic curricula, designed for the education of mining engineers, differ surprisingly in various parts of the country. From the diversity of circumstances responsible for this condition, two factors stand out as largely determinative; first, the location of each particular university with regard to mining areas; and second, the personal convictions and ideals of each particular professorial staff. The first of the two factors, the geographical one, governs the relative stress laid on different types of mining and milling operations. For instance, universities situated in or near petroleum areas have specialized in petroleum courses; those located in coal areas naturally emphasize coal mining, and so on. But according to Mr. J. T. Hoover, who analysed no less than fifty mining curricula, the human, not the geographical, element is the more important of the two. He concludes that Mining Engineering courses in American universities have been built around men, each one an expert in some specialized field, who have constructed or modified their courses in the light of their individual experiences and interests. Judged by the size of student enrollments and the subsequent careers of graduates, academic success consists in maintaining a sanely adjusted equilibrium between general and specialized subjects, between the cultural and practical sides of the program.

Until very recently, the idea of giving engineering students intensive instruction in finance, business methods, technical writing, labor organization and kindred subjects was for some inexplicable reason, considered *infra dig*—it simply was'nt done. The technical graduate must at all costs be a technical graduate. As an embryo mining engineer, it was impressed upon him that his world consisted primarily of rocks and of such mechanical equipment as would facilitate the economic mining of those rocks. His business was simply to apply technical knowledge in the matter of rocks. That in doing this he must first deal with the owners of the rocks and with other people interested in them was an incidental and a comparatively insignificant circumstance. Traditional professional ideals made it appear more dignified, more fitting, to deal with rocks than to deal with men. The inevitable result was that the young graduate was so obsessed with the supposed omnipotence of technicalities that his performance in the business world was both pathetic and ludicrous. His handling of labor was as a rule, equally ineffective. Poor chap, he hadn't long left the academic apron strings before he found that the world of reality wasn't entirely made up of drill steel, ore bodies, flow sheets, and assay samples; and depending on each man's temperamental propensities, the realization came either as a disillusionment, or as the dawn of unanticipated opportunity. In either case the more agility he displayed in adapting himself to his newly discovered world of men, the more surely did he pave the way for a successful subsequent career.

If we are to judge by the new curriculum planned for the term 1922-3 in the department of mining engineering at the University of Toronto, traditional views of engineering education are undergoing considerable remodelling. The philosophy of mining education is broadening. The aim now appears to be to graduate potential business men as well as skilled technicians. It is becoming more generally recognised that a preponderance of emphasis on technicalities (at the expense of cultural and business elements) produces a distortion incompatible with professional ideals. The trend of academic instruction is beginning to show an appreciation of this fact.

A graduate of this year, comparing the projected course for 1922-23 with that offered him in his freshman days, would observe a number of important changes in the curriculum. In general the object is now evidently to introduce the student to mining at an earlier stage of the game than was formerly the case. Heretofore the first year program was identical with that of the other courses—civil, mechanical, electrical, chemical, etc. The new calendar shows that two new subjects peculiar to the mining student's special needs have been added, namely: mineralogy and mining. The latter will include practical examination of mining apparatus and an elementary study of mining methods.

It will be of value if it only serves to acquaint the beginner with the general appearance and function of a common rock drill. With this knowledge in his possession, his début as a drill-helper will be free from the wondering awe with which his less sophisticated predecessors have regarded the "bohunk" drill runner.

The second year has undergone a radical readjustment, and despite the transference of the heavier methematics to the first year, is still the most difficult of all four. With the new additions, Theory of Measurement, Ore dressing, Steam Engines and Theory of Mechanism, it embraces some fifteen formidable subjects. The series of lectures to be given next year by Prof. H. E. T. Haultain, in Theory of Measurement, is designed to deal with the causes of error in measurement and the practical application of approximations. Steam Engines and Theory of Mechanism have been added in recognition of the fact that the work of the miner frequently borders on, and may even include, that of a mechanical engineer. The chief innovation in the third year is the laboratory work in connection with Introductory Research. Three hours per week in the spring term are to be devoted to the application of the general principles of scientific investigation. The aim is not so much to solve specific problems as to afford practical experience in research methods. Two years ago a summer surveying camp was established at Gull Lake in Haliburton County. Mining students are required to spend four weeks there acquiring practical experience in field work before entering their third year. A considerable variety of surveying is undertaken during this month including stadia and boundary traverses, triangulation, cross sectioning and computation of earth works, topography and some hydrographic work.

In the fourth year, lectures in Business Management and Metallography have supplanted petrography and chemical lab. Apart from this, the most significant adjustment is the additional time set aside for research work. A thesis is required in the department of Mining based on original research work done in the milling, assaying and chemical laboratories. Its purpose is the development of individual initiative; each man selects some simple technical problem in which he is interested and devotes ten hours per week to solving it. It matters little that due to time limitations he seldom fully succeeds; the justification of undergraduate research lies in the fact that the

student's mental processes have been stimulated and developed.

The fifth year work in Mining for the degree of Master of Science is attracting an increasing number of graduates each year. A splendid opportunity for research work in assaying and ore dressing is afforded. Investigation and research are becoming more and more an integral part of mining operations and the fifth year work is a special training in this direction. In addition to some special research work, all candidates for the advanced degree are required to devote some time to the study of the following subjects. Cost keeping, in connection with efficiency and motion study, patents, and technical writing.

The business element is to be strengthened by the addition of a series of lectures in general business and technical writing in the first year. The latter will include compilation of data and writing of different types of engineering reports, and a study of technical terminology. There will be a cultural as well as a practical value in this course, since the expression of ideas which it aims to encourage is essentially a literary accomplishment.

In addition to the usual six months' experience in actual mining, beginning with next year each student will be required to spend at least two months of his vacation as office man or clerk. This will provide some understanding of office and executive routine and will supplement in a practical way the academic instruction in business, management and cost-keeping.

INVESTIGATIONS OF PEAT BOGS IN ONTARIO DURING 1921

In the Summary Report, Part D, 1921, of the Geological Survey, about to be published, there is included the result of Mr A. Anrep's annual investigation into the peat resources of the province. In view of what is generally believed to be imminence of its commercial use as fuel, various communities are now taking a decided interest in the potential sources of this fuel in their vicinities.

Last summer Mr. Anrep surveyed four bogs, having a total of over 10,000 acres. Three of these, in the vicinity of Port Arthur and Fort William, have a combined content of slightly over two million tons of fuel (as prepared), including only those parts of the bogs whence the peat can be economically recovered. The Verona bog, north of Kingston, contains over ten million tons of similar fuel.

Arthur Peat Bog

This bog, nine miles west of Fort William, has a total area of 1,474 acres, on 932 acres of which the peat is over 5 feet deep, with an average of 7 feet. Though mixed with roots and stumps, the peat is fairly well humified, and could be manufactured for fuel. The bog could be easily drained. 1,003,000 tons of peat fuel could be produced from the bog.

William Peat Bog

The William bog, near both Fort William and Port Arthur, contains 863 acres with an average depth of 7 feet of peat, the remainder of its 1,789 acres being less than five feet in depth. The peat is fairly well humified, and though slightly imferior to that of the Arthur bog, could be used for the manufacture of machine peat, of which 928,000 tons could be produced.

Both the above bogs are very conveniently situated as regards market.

Twin Cities Peat Bog

Though 993 acres in total extent, 895 acres of this bog have peat to a depth of less than five feet, which is not workable commercially. The 105,000 tons of potential fuel available in the remaining 98 acres is not likely to be used, as the ground is already drained preparatory for use, as it is within the limits of Port Arthur and Fort William.

Verona Peat Bog

Of the ten square miles covered by this bog, almost nine square miles, on 5,404 acres, has peat to a depth of five feet or more. The recoverable fuel is 10,636,000 tons. It is 30 miles north of Kingston, and is intersected by both C. P. R. and C.N.R. The bog can be easily drained, and the quality of the peat is good. "The bog is deepest between Verona and Bellrock, and if the surface there were cleared and the bog properly drained, it would be very suitable for fuel."

Gradually, year by year, the potential fuel resources of Ontario and Quebec have been thus determined. The total is now impressive; yet the work has been merely commenced.

* Published by permission of the Director, Geological Survey, Ottawa.

Correspondence

To the Editor,
Canadian Mining Journal,
Dear Sir,

In your issue of May 19th last, Mr. Alex. Gray in his "News and Comments," refers to a certain advertisement which I published in the Montreal Star, headed "Gold Mining Opportunity".

There are so many of your readers who in the above satire will recognize my connection with the matter that I place great hope in your giving this reply the consideration which it deserves.

First of all I will correct my mistake in connection with Mr. Bancroft's title. Mr. Bancroft is with the Granby Company at Anyox, B.C. and not the Consolidated Company. That, however, does not affect the mine in question. The point at stake is whether my advertisement was a "come on" ad., as Mr. Gray states, or not.

Mr. Gray speaks of certain articles published in newspapers of two continents stating that "Labrador has the Mother Lode of Canada, one offshoot being near the Transcontinental Railway in Quebec". No doubt he infers that I inspired those articles. As a matter of fact I did not. I was interviewed in London about the mineral resources of Quebec and I described the magnesite, feldspar and asbestos deposits of the Province of Quebec. I also gave an account of the gold discoveries in the Harricana district and displayed to the reporters spectacular gold specimens from the very property which seems to rile my friend so. Some of these specimens of gold ore weighing from one to two hundred pounds, yielded on extraction from fifty per cent to two per cent in gold by weight. One specimen treated right here in Montreal weighed two pounds and yielded Three Hundred and Sixty Dollars of gold.

I told those reporters then what Mr. C. V. Corless told the members of the Institute of Mining and Metallurgy at Ottawa in March this year, viz: that the major portion of the pre-Cambrian area surrounding Hudson Bay is located within the Province of Quebec, and that as the minor part of this area had given Ontario such bonanza fields as Cobalt, Porcupine, Sudbury, Kirkland Lake, and others, so the major part might well hold in store for Quebec as great, if not greater riches. If the reporters then hashed up my remarks and served the public with a good-looking mince pie, that cannot reflect on me.

Mr. Gray, in his "Controversy over Canada's Horoscope," upholds Sir Percy Fitzpatrick when he says: "The Optimist is always right." Sporting spirit is what makes the world move, says Mr. Gray. Well, it was mighty poor sporting spirit on his part to attack me without knowing any of the facts. Mr. Gray never saw my property. If he had, he would now be boosting it instead of knocking it. He refers to Mr. Bancroft's report as "not being a thing to enthuse over." I say Mr. Bancroft saw this property in its very early development,and Mr. Bancroft's report is satisfactory under those circumstances.

Now we come to the point where Mr. Gray, in connection with the newspaper comments regarding Quebec's Mineral resources, says: "London sat up and took notice. An alert mining engineer visited Quebec and inspected this real gold mine, etc."

I emphatically deny this. Mr. H. S. Denny, E. M. of London, England, was appointed by friends with my consent to visit this and other properties. Mr. Gray never saw Mr. Denny's report, nor did Mr. Denny ever pass any of the remarks attributed to him. Surely Mr. Denny told him nothing, because Mr. Denny would not make anyone his confidant other than his principals who sent him here.

Mr. Denny's report on this gold property, as a matter of fact, was not unfavorable. His principals have repeatedly made me propositions in connection with this property, but I prefer to handle its development along different lines. Mr. Denny called the property "a very good prospect in an unknown and undeveloped district." Now that is quite different from what Mr. Gray says, don't you think so, Mr. Editor?

Furthermore my kind friend takes no notice whatever of the reports by Messrs. John W. Bell, Adhemar Mailhiot and Charles Spearman, all professional men in good standing; unless our modern crusader does not think their opinion worth anything. Was not Professor Mailhiot sent to my property by the Quebec Mining Department, and did he not publish a most interesting report on the whole district? Did not Mr. Bancroft conclude his report by advising that "not a single stone should be left unturned in this district to determine its true value?"

There only remains one more question to be answered. Mr. Gray seems to take it for granted that there is no payable ore in any quantity on this property. This opinion, no doubt, is unwarranted and unjustified. In the course of operations I have exposed numerous veins. One of these has been stripped for a distance of 650 feet; is 22 inches wide; has been sunk upon to a depth of 110 feet, and yields $30. of gold per ton. Another vein, over 300 feet, down to 60 feet, shows $26.10 per ton. An ore body, some 100 feet wide, shows spectacularly rich ore in many places, and in a shaft on part of this ore zone ,at a depth of 60 feet, Mr Bell of McGill University, mined 83 tons of quartz, which were put through the stamp mill at McGill, and yielded $39.64 of gold per ton. This lot consisted of clean quartz, with no visible gold present.

Now, if this prospect is not worthy of spending $25,000. on it, and if I, after spending $57,000. of my own money on its development, have not got the right to advertise for a partner without being subjected to attack by Mr. Gray, will that gentleman please step forward and just say that we in Quebec cannot open our mouths about our Province's resources, and that this privilege is only reserved for our more fortunate brethren of Ontario?

Yours, etc.
S. E. Melkman

Montreal, May 26th, 1922

MR. H. C. CROW

After twelve years as sales manager of the Canada Metal Co., Limited, of Toronto, Mr. H. C. Crow has resigned his position and opened offices in the McKinnon Building, Toronto, for the Blue Quartz Gold Mines Limited, of which he is president.

The development of this Northern Ontario gold property has now reached a stage where it is considered that Mr. Crow devote his whole time to its interests. He intends leaving for England in connection with the business of the Company within the next [illegible] and will be gone for several months.

United States [illegible] figures for the mica industry are not yet available for 1921. In the year 1920, a total of 6,565 tons of domestic sheet and scrap mica was sold in the United States. The average price of all mica sold was $109 per ton, and the average price per pound of sheet mica, 39 cents. Rough trimmed sheet mica of good quality, split and sorted to size, brought 54 cents per pound. Mica in lots of 10 pounds brought as high as $2.00 per pound. Intermediate sizes ranged in price accordingly. England and Canada were the leading consumers of mica exported.

News and Comments

BY ALEXANDER GRAY

Lunar Green Cheese

Were it not for the after effects of it all, it would be infinitely more agreeable to pass unnoticed a good deal of the publicity being dispensed on behalf of the Argonaut and other areas extending over into Quebec. There will always be a certain amount of that sort of thing done in order to raise funds. It is not an easy matter to draw the line between prevarication and the truth — and every legitimate prospect is entitled to a limited amount of credulity and cash. Unfortunately, in the campaign on behalf of the Argonaut (for which the mine management may not be altogether reponsible) the tendency has been toward over-indulgence in "dope". To illustrate, a recent issue of "The Montreal Star" may be cited. A wire from Dane stated that "the success which has attended the efforts off the management of Argonaut Limited to demonstrate that the deposit of gold on their property can be mined at an exceedingly good profit", has resulted in "great activity" in the locality, and "it is believed the gold dyke extends along into Quebec", etc.

Montreal was given both barrels, so to speak; on another page of the same issue Lightning River gold values were certified in this picturesque manner:

"It is a fact that the veins of every Gold Mine in Northern Ontario have improved with depth, not only in richness of ore but in the size of the ore bodies.

"On the first 100 feet of sinking, the largest and most successful mine on the Porcupine District produced gold at the rate of $4.00 to the ton".

By contrast, Lightning River assays are quoted running six and ten times four dollars; so "it may only be guessed what the Lightning River Gold Mines properties will produce when in full operation."

This deduction is perfectly true. Rather than "guess" so far ahead, however, it is safer to stick to the text that "the most successful mine in the Porcupine District" made a trial shipment from its initial working that averaged quite a bit above $4. That, though is less relevant than the further assertion that the company concerned have four properties "every one of which shows unquestionably evidence of containing great wealth."

Those who adhere to the Cousin Jack maxim, "where it is: there it is", will not render drum-head judgment as to all of this, or part of it. The Argonaut has not "demonstrated" it can mine and mill "at an exceedingly good profit." It may do so; but the York mill did not do it, and the new mill will not be ready for some time, according to the rate of progress being made. At the moment, the management is dealing with a faulted ore-body, and nothing is being left undone to locate the ore by diamond drill. That there is excellent ore, is not disputed. Whether it will feed a mill long enough is not to be determined by "guessing". And as to Lightning River being the Aurora Borealis, Midnight Sun and all the orbs of day and night combined, it is as well to quote what Percy E. Hopkins says in his Historical Summary of Gold Mining in Ontario:

"Type of Gold Lode-Sheeted zone, e. g. minute fractures closely spaced and parallel. Examples are the Howey-Cochenour at Lightning River", etc.

"Lightning River—In August, 1917, gold was found on the Howey-Cochenour claim L. 7315, in Holloway Township. According to A. G. Burrows and C. W. Knight, the rocks comprise alternating flows of Keewatin basalt and rhyolite lying in a nearly vertical position. The rhyolite in many parts of the area shows the presence of gold in small quantities. The original discovery is a sheeted zone from 2 to 3 feet wide, in which is a persistent quartz vein up to 10 or 12 inches wide containing calcite, chlorite, feldspar, pyrite, zinc blende, galena and visible gold. A 70-foot incline shaft was put down on the vein, but values lowered considerably when the vein passed from the more basic rock into ryolite. Other important discoveries were made in the area during 1921."

Should the latest of the discoveries justify the representations contained in the newspaper advertisements, Lightning River differs somewhat from what Messrs. Burrows and Knight discerned. Anyhow, it is stretching it to make the claim that "Every vein has improved with depth".

A "Pool" There Was

Paraphrasing Kipling (though doing it apologetically may not be amiss in referring to expensive advertisements appearing in the daily press about "The Gold Pool". The heading is of the "Stop, Look, Listen" sort. Couched in reverse English, for the purposes of this comment, the more ominous word "danger" might be added. A "Funding Company" prposes to take "anything from $30 to $3,000", from anyone, and to deal "in the shares of an active listed Northern Ontario Gold Mining Company", upon whose property "sufficient development work has been done—sufficient test shipments of ore made to the smelter—to warrant the belief that untold profits are possible".

Nothing is said about the emoluments to accrue to the managers of this "pool". As a matter of course they will have a percentage. Their scheme is novel, though not new. Exactly what advantage there is going to be in the surrender of cash for what may be vendor or promotion shares, need not be dilated on. The "pussy-footing" tactics displayed convey their admonition, that if purchasers have no judgment of their own to exercise, they should avoid shares selling in the open market for 15 or 20 cents. There is money enough for every bona fide prospect in the North Country recommended by reputable, capable Mining Engineers, without enticing the public to plunge in a pool that has a "no bottom" sign. Only the other day this "Funding Company" was supposed to have taken an option on certain shares at 25c but the market price is considerably below that at present. *"A 'Pool' There Was—Even as You And I."*

Other People's Money

When a Montreal Exchange house blew up the other day it was made public that the only asset against a liability of over $600,00 was a membership in the Stock Exchange. The members of another firm were arrested for misappropriation. Other outside concerns that toppled have compromised with their creditors. More

whose money vanished while collateral disappeared, have little but the cost of liquidation to show for all the splurge they made. Prosecutions for mutifarious misdeeds, notwithstanding the exposes and disastrous consequences, have been together too few, and the only moral effect is that those who speculate probably will be more discriminating. As a rule, membership in strictly Stock Exchange firms is a guarantee of faithful performance. Daily clearances and close banking supervision provide safeguards. The integrity of many co partnerships and companies not included in Stock Exchanges is unquestioned. In the conduct of speculative business, no risks are taken that can be avoided; but there is no denying that markets have vagaries and human nature often is dereliet. A glaring example is the alleged "stockbroking" firm at New York, now in bankruptcy. The liquidator has sworn that between January, 1921, and January, 1922, "nearly four million dollars", (the amount involved) had been juggled with. The firm "spent over $2,500,000 on an income of $20,-000." Here is a partial schednle: For lunches, exclusives of lunches charged to petty cash, $35,000; Stamps, $33,000; Advertising, $71,000. Leased telegraph wires; $94,000; Branch Offices, $94,000; Stationery, $48,000; Travelling Expenses and Entertainments, $11,000, and Statistical Services, $18,000. It is hurriedly explained, however, that "these were only petty expenses". Un-administrative expenses amounted to $700,-000, mostly for branch brokerage houses. Salaries took $485,000, aside from the $310,000 in cash said to have been drawn by members of the firm during the year. General Administration cost $115,000, and Defalcations $210,237. "That's the way the money goes." Some of it is yours!

Mining Corporation of Canada, 1921

A combination of counter-currents is responsible for much of what is disclosed in the report of the Mining Corporation of Canada for the year 1921. What cheer the statement contains is substantial enough, if metal markets are responsive and speculative investments can be hastened to maturity. Whether in retrospect or in perspective, there is cold comfort in writing off $252,-939 on account of loss on Canadian Industrial Minerals, Ltd., and $231,023 on an optioned property. Failure of power, a break in the price of silver, combined with all else, precluded dividends and the maintainance of the carry-forward, which is $2,746,191 as compared with $3,268,628 the year before. While the Flin Flon and other optioned properties were written up from $109,-101 to $738,948, the total assets were written down from $11,666,686 to $11,125,945.

That the Mining Corporation remains in a strong financial position, is complimentary to the administration and management. The gross income of $578,913, as against $1,643,065 in the year previous (1,226,716 and 1,664,018 expressed in ounces silver) was mainly derived from the Buffalo property. Rather than sacrifice silver at the low market price production was curtailed; for it is to be noted that the ore reserves are estimated at 1,935,745 ounces, compared with 2,118,100 ounces. Buffalo silver reserves are estimated at 1,197,-915 ounces, a gain of 117,885 ounces after the property had yielded 731,201 ounces in 1921. Admittedly the Cobalt properties are approaching exhaustion and dividends are contingent upon the market for silver and operating costs; but the company are on the alert and "some of the properties acquired give promise of being substantial and profitable producers". In the Flin Flon alone, when capital and transportation facilities are provided, there are the elements of successful operations. Meanwhile working capital must be conserved. All of it and more will be required for larger enterprise.

Dr. Ruttan Urges Research Guilds

For reasons that need not be stated Dr. R. F. Ruttan as a pre-eminent Scientist is in a position to stand four-square when he addresses his fellows of the international British Society of Chemical Industry, of which he is President. It is the more appropriate to have a man of his achievements and independence make the retort courteous to legislative ostriches who seem to think Canada can keep on importing what she is able to produce, and exporting technical experts, graduates of her own universities, and retain those who remain upon a beggarly stipend. With about 4,000 engineers somewhere near the bread line most of them qualified by Canadian collegiate training and experience, Dr Ruttan made a patriotic appeal to the Canadian Branch of the Society of Chemical Industry for a higher valuation, a greater degree of public recognition of the services of Canadian Chemists. They had demonstrated their resourcefulness and economic worth prior to and during the War and their value can be enhanced in time of Peace and greater Competition. "More than a thousand of the best graduates of Canadian Universities have emigrated to the United States" urged Dr Ruttan, "whose industries and wealth they are developing", and if Research Guilds are provided "with simply-equipped laboratories, each costing $25,000, and sufficient salaries, it is hoped some of these brilliant men will return."

The plan advanced by Dr Ruttan is that Guilds similar to the research associations recently formed in Britain be formed from groups of industries interested in the same line of research. By this plan, and through research, he said, much can be done to liquidate the national debt.

One serious difficulty is the low standard of value maintained at Ottawa and elsewhere. Individual initiative will go so far; collective, group effort through Guilds is a practical solution. It is being proved so in the United States, not only in chemical research but wherever mechanics enter into industrial affairs. Leaders of industry have liberally subscribed funds. Inventors have the privilege of submitting their devices or formulas, duly patented or meriting consideration. Specialists pass upon the features of whatever looks like an added efficiency or an economy in any direction.

Ordinarily inventive geniuses fear sharp practice and decline to deal with principals who might regard really meritorious inventions as being inimical to their vested interests. The contrary is the declared purpose of those responsible for this central organization, to which money is devoted because progressive economies must be effected. Suppression is not contemplated. Whatever is better than anything Gary and Schwab now possess, is worth more to them, it is reasoned, than it could be to others. If there is something the General Electric and Westinghouse people need in order to increase production by simpler methods, the argument is that these great corporations will pay more for it knowing what it promises.

Dr. Ruttan has the right to call for Government aid more and than has ever been provided. Speaking to and for the Chemical Industry he exercised that right. At no time has there been greater necessity for exactly what is sought—the encouragement and retention of our Canadian made Scientists.

News of Mining

Coal buyers in the United States show an extraordinary apathy towards the non-production of anthracite. The demand for bituminous coal is increasing daily and prices are rapidly going up.

Production of coke in the Connellsville region is now about 250,000 tons per week, as compared with 150,000 tons before the strike was declared. Much dissatisfaction is reported to exist amongst miners and coke workers. Apparently no relief is being received from the United Mine Workers' Headquarters.

During January and February, 1922, Germany imported 1,131,700 tons of iron and manganese ores, and 136,912 tons of pyrites. The chief mineral exports were 1,121,800 tons of coal.

Exports of iron from Spain during 1921 came to 1,824,761 metric tons, as against 1,630,662 tons for 1920; iron pyrites, 1,195,435 tons, as compared with 1,331,150 tons; and manganese ore, 31,774 tons as compared with 47,250 tons. Similar falling-off is noted in the production of anthracite, bituminous coal, and lignite.

In the period 1914—1921, the average net increase in the weekly wages of mine and quarry workers in Great Britain is estimated at £790,100 per week.

The Government of the South African Union has introduced before the Legislature a Bill compelling the grading and certification of all coal sold for export or bunker use. An official Grading Committee are to be responsible for inspection and authorization of sales, and administration expenses will be met by levies on collieries in proportion to their shipment.

In thirty-six years the Mysore Gold Mining Company (India), Limited, has not passed a dividend. Last year the company distributed £61,000 in dividend payments. This was equivalent to 25 per cent. on its paid-up capital. The aggregate of dividends paid, including those of 1921, exceeds nine million pounds.

The Mount Morgan (Queensland) mine strike, terminated last March after it had lasted a year, is reported to have cost the strikers £300,000 in the lost wages. Work has been resumed under the disadvantageous condition of lower prices for both gold and copper. The Queensland Government is assisting the operators with weekly cash subsidies.

Gold prospecting in Nova Scotia is showing more signs of activity than at any other time in the last twenty years. Payments of the small license fees for gold and silver prospecting amounted to 3,595 in the last quarter of the fiscal year ending September 30th, 1921. This is an encouraging symptom. The projected development of water powers will largely benefit gold mining in the Province.

The United States Bureau of Mines purchased silver to the amount of 1,610,000 ounces during the week ending May 6th. Under the Pittman Act, fixing the price of domestic silver at 99 5-8 cents per ounce, the Bureau has purchased to date 109,471,356 ounces.

A lively debate on the proposed duty on cyanide (McCumber Tariff Bill) took place recently in the United States Senate. Senator McCumber, in support of the imposition of an import duty, stated that Germany, Canada, and the United States all have monopolies of the manufacture of cyanide. He cited the rise in price during the war from 10 cents to $2 per pound and claimed that without active United States production a like rise in price in the future would be inevitable. Senator Pittman answered this argument by asserting that he did not think Senator McCumber spoke candidly; that a duty would merely serve to keep the Roessler and Hasslacher Chemical Company going, and that the report of the Alien Property Custodian had shown that that concern could sell cyanide for about half their present price.

Germany has been one of the largest buyers of British iron and steel exports for some time. Her purchases in March were exceptionally heavy owing to the approaching exhaustion of supplies of scrap. Germany is forced, for this reason, to purchase foreign pig-iron.

An analysis of gold-dredging operations in California brings out the fact that the industry has been very sanely conducted. Up to the end of last year, the average earnings on investment represented a steady return of from 10 to 15 percent. There are 130 dredges in commission. Gold to the amount of about $125,000,000 has been produced since the inception of the industry.

The tacit recognition of the Soviet Government delegates at the Genoa Conference has had an important bearing upon the platinum mining industry of Russia. The resumption of normal production is foreshadowed by the fact that the Soviet Government has requested M. Louis Dupare, professor and director of the Geneva School of Chemistry, to visit Moscow for the purpose of superintending the re-organization of the crude platinum industry. M. Dupare has consented to go. He is to be given ample powers and authority.

The Council of the Federated Malay States Chamber of mines has decided against the policy of restricting tin ore outputs. Restriction of outputs had been urged on account of very poor present demand. The Council, however, is of the opinion that the remedy lies in encouraging the extension of market activities, rather than in artificial restraint of trade. In any case, the fact that very little development work was done last year will have the inevitable effect of curtailing production in the near future.

The development of large deposits of high-grade bauxite near the Dalmatian coast has had the effect of depressing the prices paid for French bauxite. Germany is reported to have purchased recently 100,000 tons of the Dalmatian ore. One shipment is stated to have had the following analysis: Alumina, 55.90 per cent.; silicia, 0.93 per cent.; titanium oxide, 3.50 per cent. It is not known to what extent this is typical of the ore bodies.

Notes From Nova Scotia

The thirtieth annual meeting of the Mining Society of Nova Scotia held its sessions in the Court House, Sydney, on the thirtieth and thirty-first days of May.

George D. MacDougall, Chief Engineer of the British Steel Corporation, was re-elected President at the opening of the session.

Other Officers elected were, C. M. O'Dell, First Vice-President, A. S. MacNeil, Second Vice-President and E. C. Hanrahan Secretary-Treasurer.

The Honorary Executive comprises T. J. Brown, Hon. Robert Drummond, F. E. Lucas, Malcolm Blue, R. E. Chambers, A. McEachern, W. H. Graham, H. B. Gillis, J. R. MacCann and J. J. MacDougall.

There were fifty members present at the opening roll call, many of them Officials of the Cape Breton Island coal and steel companies. Those from the mainland were C. H. Wright, Manager Canadian General Electric Co., Halifax, Hon. E. H. Armstrong, Halifax, Hon. Robert R. Drummond, Stellarton, W. B. Timm, Ottawa and J. C. Nicholson, Springhill.

President G. D. MacDougall's Address

President MacDougall greeted the officers and members of the Society. His address was brimfull of practical suggestions to the Society for its work of the current year. He briefly reviewed the work and progress of the Society since it was organized in 1892. At the beginning it had for many years a membership largely interested in the mining of gold and had its headquarters in the City of Halifax. With the decline of the gold mining industry and the rise of the coal mining and steel industries the headquarters was in 1913 moved to Sydney. After a successful start in 1914, the great war absorbed the energies of the members to such an extent that the regular practice could not be carried on until 1921. The success of the meeting last year and the attendance at the present meeting was sufficient proof of the vitality and excellent position of the Society.

He further said that "it is proper to read and discuss papers bearing on our Industries; it is splendid to get together as a Society to become better acquainted and to realize each other's problems. It is a satisfaction to know that we are qualified members of a Society essentially technical and the oldest Mining Society in Canada, and to be in a position to give advice to the Department of Mines when called upon. All these activities are excellent in themselves; but should we as a Society and as individuals in this present time of our country's history be content? I think not. I am not satisfied that the above represents the full measure of our capacities or responsibilities.

"What then should be our function? This may be difficult to outline but as a partial program of a suggested policy, I may be allowed to put before you some suggestions as a proposed beginning of a larger sphere of usefulness." Mr. MacDougall then outlined the following points:

Technical Research— This may not be the proper term for the activity in mind but may suffice for want of a better.

The coal output of Nova Scotia has not varied to any extent during the last ten years. The question of where in lies the solution of the problem is not necessarily a question only for the operating companies, but one that very much concerns the whole people of the Province and hence is particularly one for our Society. The questions of transportation, radius of distribution, qualities of coal for different markets, preparation of coal as may be required, the substitution of bituminous coal for anthracite, the total or partial carbonization of certain coal for specific purposes, the relation of our coal resources to steel manufacture, are some of the features which will govern our increased production. This is a most important feature of our coal trade, for without maximum production coal costs cannot be brought to the point of profitable business.

Gold mining— It is now about sixty years since gold mining has been a recorded industry in Nova Scotia. Its life has, more particularly in later days, been a fitful one with little success. The gold-bearing measures are said to be some five thousand square miles in extent, but in all this area there is today only one operating property. The general question is asked, whether we have yet learned sufficient about our gold measures and the latest systems for extraction of gold to give us confidence to apply ourselves to the opening up of the large gold-mining fields.

Geological information— It was pointed out by the President that we had added very little to the knowledge written by Richard Brown on the Cape Breton coal fields or by Mr. Faribault on our gold-bearing measures. It should be the duty of the Society to prepare a statement of this situation and forward it to the Federal Government, which would no doubt welcome from this body information tending to assist the geological survey in their investigations into all our minerals, not forgetting the extensive deposits of limestone, gypsum and salt.

Coal in Newfoundland

A paper entitled *Coal Mining in Newfoundland* was read by Mr. George Morley. The information conveyed was interesting although not encouraging. Mr Morley touched on the different attempts made by the Newfoundland Government, the Reid Railway Company and others, to open up the different coal districts. For a time he had personally supervised operations at South Branch, St. George's district. The coal was six feet thick of good quality, but not of sufficient quantity to pay for mining. On one side of the mine the coal was cut off by a fifteen hundred foot fault, while on the other sides it pinched out. Mr. Morley suggested however, that further prospecting should take place, as the work already done should be followed up to thoroughly prove the district. There was difference of opinion as to what might be found in the St. George's District seeing the country was so hilly. Those who knew Newfoundland believed that the Inland Carboniferous Basins would yield better results. The coal did not crop out there. Some boring had been done, but not sufficient to thoroughly test the measures.

Mine Explosions

Mine Explosions and their Causes with Suggestion for Prevention was the next paper. This was by Alexander MacEachern, Chief Inspector of the Dominion Coal Company. It was a most practical paper written by a man of large experience and evoked considerable discussion. It covered the whole subject from the time mine explosions began to interest scientific men up to the present when research has placed the causes of explosions beyond doubt.

The two principal causes were mine gas, (methane) and coal dust. The long period during which expert mining men investigated coal dust as a cause of mining explosions was gone over and the opinions of these experts brought out clearly. The precautions necessary against the accumulation of coal dust and of gas in the coal mine was dealt with in a masterly manner. The time was all too limited to permit of the extended discussion that was generally desired by the majority of members present. Mr. MacEachern was warmly congratulated on his efforts in bringing before the Society the subject matter of what today is everywhere a live question in coal mining.

Studies of the Past Generation

Men and Methods of a Past Generation was the subject of a paper by C. M. O'Dell, Mining Engineer. Mr. O'Dell,in his own inimitable way, which is always highly enjoyed by the members of the Society, added a new page of history to the mining industry of the Province. If we are indebted to Richard Brown for geological information, we are deeply indebted to Mr. O'Dell for his graphic sketches of the men who opened up in the early days the coal measures and mines of Cape Breton. It was most interesting to go with Mr O'Dell to the different early collieries, and to see the men who developed the work, to observe the difficulties they had to overcome, the courage with which they attacked their problems and the ultimate success achieved. The failures and causes of failure of many of the early companies as well as later ones were clearly pointed out.

Mr. O'Dell's paper is to be made part of the mining history of Nova Scotia and arrangements have been made to have it put into pamphlet form for general circulation.

Mine Pumping

Mine Pumping Problems by Karl Marsh, Mining Engineer, Dominion Coal Company was most instructive dealing as it did with the effects of the acid and corrosive properties of mine water. He pointed out that in the Dominion Coal Company operations in Cape Breton, five tons of water are pumped to the surface to each ton of coal.

As the mine water of some of the Dominion collieries and also of Inverness colliery is of an acid nature, the problem of mine pumps has been a most perplexing one. The high heads against which the pumps of Dominion collieries work makes it all the more difficult to get a material that will stand for any time. Rubber highly hardened has stood well up where heads are not too high.

Mr. Marsh's paper, touching as it did a problem which confronts every mine official, threw a flood of light on mine pumping and its difficulties as well as its successes.

Coal in Malaya

A very interesting paper on *Coal Mining in Malaya* was read by Thos. L. McColl, Mining Engineer, Acadia Coal Company. Mr. McColl had opened up a coal mine in Malaya and in doing so had met with great difficulties. The seam was seventy feet thick with clay bands of a few feet in thickness at intervals. Twenty-four feet of this seam was extracted. Spontaneous combustion was one of the difficulties encountered early in the operation. Indeed, so many fires occured at the corners of pillars that were split (the coal being friable and the air passing through), that larger air-space had to be given to relieve the pressure to prevent fires breaking out. About eight feet of coal was first extracted, and to prevent fires breaking out hydraulic stowage was adopted, sand and gravel, with a small mixture of clay to make the pipes smooth, being used. Wherever the stowage was done, fires ceased to occur. The difficulties of transportation and of electric motive power due to heating of the motors by hot weather, also poor labour supply, had all to be overcome. Yet Mr. MacColl had overcome all difficulties and succeeded in reaching an output of 240,000 tons per annum.

Electric Motors for Mining

A paper read by C. H. Wright on *Electric Motors for Mining* was illustrated by screen and many different types of electric mining machines, motors etc., were shown and explained. In the course of his remarks Mr. Wright said that the electric haulage engines, the electric pumps of some of the Dominion Collieries and a new switch-board lately installed were the best in Canada and could not be excelled in the collieries of the United States. As mining by electricity or electrical power is to be adopted in the Cape Breton collieries on a much larger scale than at present, this paper was very timely and helped to give needed information to the mining men present.

Mining under Heavy Cover

Past and Present Mining Methods in Springhill by J. C. Nicholson, District Superintendent, brought the problem of methods of mining under heavy cover before the Society. Like the collieries of Crows Nest Pass, No. 2 Mine Springhill had been affected by bumps. These had been a great source of danger and of loss of time and had taxed the ingenuity of the mining men at Springhill. Various efforts were made to change the method of mining, with more or less success, but finally a method had been adopted that had succeeded and no bumps had occured in Springhill for considerable time. Mr. Nicholson stated that the system was not, however, without its weak features, one of them being the small outputs from the different sections. This was impossible to overcome as too much coal extracted over wide districts led to bumping, loss of coal and loss of life. Sketches were shown of the method and the points where pressure was exerted by the overhead strata which, in breaking, caused bumping.

Mr. Nicholson is a comparatively young man and was highly commended in the success he attained in the Springhill collieries.

Research

W. B. Timm, representing the Moris Branch, Ottawa, read a paper on *Research*, dealing largely with gold, copper etc. A local touch was given when "Sterling Mine", Loch Lomond, Cape Breton, was referred to and an analysis of ores found in that district was read. It was found that the ore was "complex", carrying sulphides of copper, lead, iron and zinc, with gold and silver specks showing. .

Mr. Timm went out to the mine on the following day, and although the trenches had fallen in he succeeded in securing good specimens of ore which he intends to have analysed at Ottawa.

The meetings of the Mining Society were marked by enthusiasm, good will and a common desire of the members to increase their knowledge. The papers read were of a high order and calculated to arouse interest, to stimulate action and to broaden the intellectual horizon. The fields of knowledge traversed were diverse; but wherever we travelled we found "tongues on trees, books in running brooks, sermons in stones," and profit in all.

British Columbia Letter

Geological Survey Parties

There will be twelve parties of the Geological Survey of Canada working in British Columbia this summer. Nine of these will be on geological investigation and three on topographical surveys. Those who have been assigned to field work are: Dr. J. D. MacKenzie, head of the B. C. office of the Geological Survey; Dr. George Hanson; Dr. M. E. Bancroft; Dr. W. L. Uglow; Dr. S. J. Schofield; Dr. Victor Dolmage; Dr. G. A. Young; Dr. W. A. Johnston; Dr. C. A. Cairnes; Dr. W. A. Cockfield; C. T. Shepherd, R. G. Bartlett and D. A. Nichols. The aim of the department is to obtain the maximum results with the minimum expenditure, and to this end the field work is designed to produce definite results in particular areas and to maintain a sequence of research which will progress with the impetus derived from past results.

"In line with the policy of the B. C. office in keeping closely in touch with mining and prospecting development," said Dr. J. D. Mackenzie, "we are giving attention to the areas where greatest interest centres. Dr. Johnston and Dr. Uglow will both conduct researches in the Cariboo placer gold areas and their work should be of very great assistance to the development of that country. In Northern B. C., Dr. George Hanson will begin a reconnaissance of the eastern contact of the granite batholith, as it is of great importance to have its outlines and relations thoroughly studied. Dr. Hanson's work will have special reference to the possibility of the extension of the richly mineralized zones such as those in which the Premier and the Dolly Varden mines occur. He will investigate the Kitsumgallum Valley and will pay particular attention to the possibilities for petroleum there. Dr. Victor Dolmage will continue his investigation of the coastline of the province. This year he plans to finish it by covering the stretch of the coast and islands from Bella Bella to the Alaskan boundary. He is making a special study of the relation of economically valuable deposits, such as the mines at Surf Inlet and Granby Bay, to the general structure of the batholith, with the idea of outlining favorable areas for prospecting.

"The importance of coal to Canada is becoming more and more clearly recognized, and it is most desirable that the coal resources of the country be carefully inventoried. To fulfil a part of this requirement the department has instructed me to continue the investigation of the coalfields on Vancouver Island that I began last summer. A considerable knowledge of some of the peculiarities of these exceptional coal fields has already been gained, and it is hoped that this season's explorations will be of material value.

"The geological investigation that will probably command the widest public interest is the examination of the iron ore resources of B. C. that will be undertaken this year by Dr. G. A. Young. Dr. Young has made a specialty of the iron resources of the Dominion. A co-operative investigation of the iron deposits jointly by the Geological Survey and the Provincial Department of Mines has been arranged.

"The establishment of an iron industry in the province has long been hoped for, and certain basis factors are required before any industry can be established. It is the province of the Geological Survey to ascertain whether or not the raw materials are available in sufficient quantity.

"Dr. Young is especially anxious that no iron deposit of prospective value be overlooked, and he would be glad if the owners of any such deposits will send him all the particulars at their command. Such information as the location, elevation, means of access, type of ore, probable tonnage, and references to former reports will be most valuable.

"An iron industry would be of incalculable benefit, not only to the province but to the whole of Canada.

"Dr. W. A. Johnston will continue his study of the placer gold deposits in the Cariboo district begun last year. The work then done resulted in the conviction that there are areas in the Cariboo district where dredging can be profitably carried on. The field work will embrace a study of the bed-rock geology as well as an investigation of the surface deposits, with which the placer gold is associated. This part of the work will be in charge of Dr. W. L. Uglow, of the University of British Columbia.

"During the past two field seasons Dr. C. E. Cairnes has been studying the ore deposits and the general geology of the Coquihalla area. This year Dr. Cairnes will extend his results south and southeastward. One reason for so doing is to correlate the geology of the Coquihalla area and the section along the C. P. R. with the geology of the Similkameen and Tulameen Valleys and the Hedley gold mining area. Another reason is to gain information about the general distribution and habit of the peridotite rocks of this region. These exceptional igneous rocks are those in which platinum has its origin and it is from them that the platinum placers of the region have been derived.

"In the Lardeau Dr. M. F. Bancroft will conclude his study of the structure of the ore deposits of the region. His results have disclosed many interesting features about the mining camps of this part of the Province, and some of the data he has gathered are of the greatest scientific interest.

"Last season an investigation of the Windermere map area was commenced by Dr. S. J. Schofield. This work will be continued during the present field season. Dr. Schofield secured some very interesting and significant results from his work of last year.

"Dr. W. E. Cockfield has already passed through Vancouver on his way to Whitehorse, Yukon Territory, from where he will start on an investigation of a large area extending southeastward toward the Atlin district in B. C. Some parts of this region have already been examined by R. G. McConnell, the late Professor Gwillim and D. D. Cairnes for the Geological Survey. Dr. Cockfield's investigation is planned to correlate the results of these earlier workers. The information to be gained will fill a gap in the knowledge of the survey regarding the general geology of Northern B. C. and the Yukon.

"The topographical work of the survey serves a dual purpose. In most cases it is primarily intended to make base maps on which to delineate the areal geology of a region, but these maps also have great utility of their own.

"Topographical work is also being done east of Kootenay Lake by R. G. Bartlett. These maps, when completed, will serve as an aid in the study of an important area of pre-Cambrian rocks whose relations are at the present time obscure. A map for the purpose of forming the base for the detailed study of the very important ore deposits of the many properties in the vicinity of Copper Mountain and Voight's Camp, Smelkameen Valley, will be made this year by D. A. Nichols."

Oil and Gas

The Atlas Petroleum Co., Ltd., has started drilling

operations at Hall's Landing, 20 miles south of Revelstoke, B.C. W. F. Marrion, Field Manager, is in charge of the work. This Company has secured 3000 acres of crown granted and provincial leases. Those interested are confident that they will strike this season either oil or gas.

A party of 17 men has left for Hudsons' Hope in the Peace River section of the Province. They will commence drilling immediately on the property of the Consolidated Oil and Development Co., the principal shareholders of which are residents of Minnesota. An unusual feature of the equipment of this party is a wireless plant of sufficient power, it is said, to send messages from the scene of operations to Chicago, Illinois. Daily progress reports will be made to J. A. Merrill of Superior, Wisconsin.

Nineteen gas and oil claims have been staked in the Kispiox Valley by Henry Brelzin and Angus Beaton. They have made arrangements with United States financial men for a geological examination of the property. If this is favorable drilling operations will be started.

The Coal Mines

The situation in the Crow's Nest Pass coal-field remains unchanged. There are no indications that an early settlement of the strike will be effected. Although the Conciliation Board is at work it would appear from report that little progress is being made toward arriving at a basis for settlement. Meanwhile the men seem to be finding employment elsewhere and the Company does not seem to be disposed to make any concessions.

W. R. Wilson, President of the Crow's Nest Pass Coal Co., in giving evidence before the Board stated that since 1903 his Company had lost through strike and lockouts $3,429,045. He stated further that his Company had paid an average yearly return of only 2.46 per cent. since 1910 on its investment of $6,200,000. In 1921 his Company paid contract miners an average of $9.13 per day, and day miners an average of $7.75, the former being an increase of 125.5 and the latter of 152.5 per cent. compared with the wage rate of 1910.

The coal market on the Pacific Coast continues unfavorable. The mines of Vancouver Island are not working to capacity by any means. Domestic trade has fallen off with the advent of warm weather and the bunkering business has failed to show any improvement. The result is that the miners of Ladysmith, Nanaimo and Cumberland are finding plenty of time for indulgence in outdoor sports.

George Wilkinson, R. P. E. recently completed a survey of the coal areas of Alberni district, Vancouver Island, for the Provincial Department of Mines. This work was done at the request of the municipality of Port Alberni, officials of which are of the opinion that coal seams on municipal lands may be developed to the profit of the community. Mr. Wilkinson found that there are some promising outcrops and that near the surface the coal is of a very high grade. In fact at this point it is an anthracite and probably of better quality than any other island coal. It would seem, however, that generally speaking, these deposits belong to the same classification as those of the Comox district, and that with further opening up, the seams will yield coal of the same bituminous grade as is found on the east coast. Of course it is impossible to say how extensive the Port Alberni coal bearing lands are without further prospecting. It is possible that this will be undertaken and the result may be the opening up of a new and important area.

The Community Coal and Coke Co. has been organized to take over and exploit the Normandale property in the Nicola valley. Recently a 10 ft. seam of high grade coal was cut in a tunnel that was driven above the Government road. It is proposed to commence mining and shipping in a small way immediately.

It is interesting to note that the output of British Columbia Collieries for the first three months of the present year was considerably in excess of that over the same period of 1921. Following are the comparative statements:

District	Tons. 1922	1921
Vancouver Island	445,305	405,681
Nicola-Princeton	65,442	44,877
Crow's Nest Pass	239,608	186,775

Government mining engineers in British Columbia have addressed between three and four thousand prospectors or potential prospectors in lectures delivered during the past winter. In one district the engineer was called upon to speak to the children attending public schools. It is generally agreed that no more effective method could be found for stimulating interest in minerals and the mining industry.

The first of the vessels leaving British Columbia and Washington State ports for Nome, Alaska, is on her way North. The season has opened and mining operations there soon will be in full blast.

The extension of the Premier Mine road, the construction of a trail into the Unuk country, the building of a bridge over the Bear River and the rebuilding of that over the Marmot as well as considerable maintenance work are some of the likely activities of the Provincial Government in the Northwestern section of the Province this year. It also is suggested that a road should be built further up the Kitsault Valley than is reached by the Dolly Varden railroad, and that there should be a trail from Alice Arm to Stewart. The latter is rather an ambitious project, but the route will be surveyed this year.

If the Dolly Varden Mine and property passes into the hands of George Wingfield of the Goldfields Consolidated and associates, it is suggested that a new Company will be formed for the further development of the mine and adjacent claims. The plan now proposed is the formation of a company in which will be represented other creditors of the Taylor Company, shares being allotted them in proportion to their claims.

The Exchange Group north of Premier Mine, Portland Canal, is reported to be the scene of a new strike. The mineralized zone is said to be between 80 and 85 feet wide and has been traced on the surface for 700 ft.

The Mahood Mines, Ltd. owning the Divide, Sunrise and other claims in the Salmon River District is changing its name to the American Mining and Milling Co. Ltd.

The I. X. L. Mine near Rossland is reported to again be yielding very rich ore. The Bonanza ore shoot is said to have been recovered. This shoot has given a return during the last few months of more than $30,000.

There are 300,000 tons of coal in the heaps at Glace Bay. This is a large amount to stock but after all, it is only a small month's output when things are normal.

Northern Ontario Letter

Gold Production in May

According to preliminary estimates, the gold mines of Porcupine and Kirkland Lake produced upwards of $1,755,000 during the month of May. In the order of their importance, the producers were: Hollinger Consolidated, Dome Mines, McIntyre-Porcupine, Wright-Hargreaves, Lake Shore, Teck-Hughes, Kirkland Lake and Tough-Oakes. These eight mines are in a position to maintain production in each case, while the McIntyre will add to its output during the latter part of June through setting additional milling equipment in operation.

A total of approximately 3,480 men were employed at the producing mines, while approximately 172,000 tons of ore were mined and milled. This shows the interesting information that approximately 49 tons were handled by each man during the month. It also shows that the average grade of the ore at the mines as a whole was maintained at a little over $10 per ton.

In addition to the foregoing details about the producing mines, it is interesting to note that activity is increasing around the mines in the development stage. Notable among these was the resumption of work on the Porcupine V. N. T. where another important gold producer appears to be in the making. It is also to be noted that the Sylvanite at Kirkland Lake is rapidly developing to a point where another big producer is assured, while the Bighood Gold Mines are gradually being worked into a position where the installation of a mill will be undertaken. At the Argonaut Gold, ore has been found at a depth of 500 feet and this enterprise may be turning out gold bricks during the last quarter of the current year.

These non-producers, as well as numerous others under exploration and development, are employing a substantial aggregate of men, and it would appear that at least 5,000 men are now employed directly at the gold mines of Porcupine and Kirkland Lake.

Amendment Defeated

The bill to increase the amount of assessment work on mining claims having failed to pass through the Ontario House, the holders of mining claims are thereby relieved from the anxiety of uncertainty as to its application to claims staked under the prevailing regulations.

Information was sent broadcast through the press, that the Amendment was going through and that it was the product of Hon. H. Mills, Ontario Minister of Mines This was an injustice to Hon. Mr. Mills as the bill was being fathered by Howard G. Ferguson, and was subsequently defeated.

Good Results on Kirkland

The result of deep mining operations on the property of the Kirkland Lake Mining Company has been more favorable during recent months than at any point in the mine above a depth of 800 feet. Although net profits have been comparatively small during the past year, nevertheless the production has been sufficient to pay for the extensive amount of development work being done. All this work is an asset for the future, while a continuation of the favorable results recently obtaining should soon bring the enterprise to a position where net profits will increase substantially

Development Work on the Hattie Prospect

Carlos Warfield, formerly associated with Augustus Heintz, has been on the Hattie Gold Mines for the past two weeks, and expresses himself as favorably impressed with the property.

A force of sixteen men are now at work, and arrangements are being made to continue the shaft to deeper levels on No.2. vein. It is also planned to carry on additional surface exploration.

Some rich specimens have been taken out of the Hattie property, the work being supervised by Mr. Warfield, who is representing a Montreal syndicate.

Clifton-Porcupine

Work has been resumed in a small way on the Clifton-Porcupine property, and already some good results have attended the work. A new vein has been discovered, having a width of three feet and carrying visible gold, the deposit being called "The Lucky Strike".

No. 3 shaft is being de-watered and a small crew is engaged in doing surface work, stripping the outcrop of veins which occur on that part of the property. Among other things, it is planned to carry lateral work to the new vein underground as well as develop other parallel veins in the near vicinity.

Wm. C. Offer is in charge of operations on the Clifton Porcupine and expresses the belief that important results will follow the commencement of underground work. Mr. Offer will be in Toronto this week for the purpose of attending a meeting of the directors at which time the construction of a milling plant will be authorized, according to official advice. Plans have already been prepared for this new mill, and the plant will be used for treating high grade ore already placed in sight in the present underground workings down to a depth of 225 feet. Construction work may be expected to start within the next few weeks.

Canadian Kirkland

Surface work is under way on the Canadian Kirkland property, preparatory to carrying on general operations A new boiler-house and shaft house are being erected, and it is planned to resume underground work within the next three weeks

A shaft is already down 150 feet on the Canadian Kirkland, and the present plans are to continue this work to a depth of at least 300 feet There are two exceptionally strong veins showing at outcrop and these occur under favorable geological conditions

The Crown Reserve Mining Company is involved in the Canadian Kirkland, to the extent of something like 150,000 shares, this having been acquired some years ago when the property was under working option to the Crown Reserve

Hollinger's Ethon Lake Property

Late advices coming from Northern Manitoba would indicate that the syndicate led by Directors of the Hollinger Consolidated Gold Mines is meeting with good encouragement on the Murray Property at Ethow Lake.

Surface work has revealed a greater breadth of mineralized area although the average gold content of the deposit has not yet been determined. Work, however, is now far enough advanced to proceed with sinking [illegible] pits and taking a general sample [illegible] surface concentration. Assaying equipment has been installed and

the future of the Elbow Lake section of Northern Manitoba will swing to a vital extent on the result of work and the assays obtained during the next few months.

Bidgood

As work proceeds at the 100 ft level of the Bidgood Gold Mines, the prospects of this property soon taking its place among the producing mines become greater. Some excellent ore is being developed and already the question of erecting a milling plant is being seriously discussed. There are those who are in favor of equipping the property with a mill this year. Others are in favor of continuing development work throughout the balance of the current year and then proceeding with transporting milling machinery to the mine over the snow roads next winter. This would allow construction work to commence in the early spring preparatory to placing the mine on a producing basis, and would give the enterprise the benefit of extensive development work in the meantime.

Goldale

Within a week, sinking operations will be under way on the Goldale property. The surface equipment has been thoroughly overhauled, while the roads have been put in good condition. The exploration work mapped out is perhaps the most interesting at the present time in the Porcupine field.

Porphyry is known to intrude the greenstones formation and thereby create geological condition which may reasonably be accompanied with important mineralization.

Claims Change Hands

One of the more important deals to be put through in recent months in the Kirkland Lake district has just been closed for a group of claims lying adjacent to the Tough-Oakes on the east. The group consists of four claims comprising approximately 160 acres. Two of the claims were formerly held by Wm. Wright, one by J. Post and one by the North-East Kirkland Company. The entire group had been held under option by G. W. Dixon of Cobalt through whom the deal was made this week with New York interests.

Porcupine Mutual Gold Mines

Among the new concerns that will engage in mining work in the Porcupine gold area is the Porcupine Mutual Gold Mines syndicate, having an authorized capital of 300 shares of the par value of $100 each, or $30,000. The promoters of the syndicate already own five mining claims situated immediately adjacent to the Hollinger Reserve property, and the purpose of the sale of the 300 shares as above mentioned is to provide capital to pay for exploration work in connection with proving the value of a gold-bearing deposit already found at outcrop. The plan of exploration will consist of diamond-drilling. It is planned to commence this work at the earliest possible date and it is agreed that on or before Dec. 31st of the current year, the manager and secretary of the syndicate will float a company known as the Porcupine Mutual Mines, Ltd., with a capital of $3,000,000, made up of 3,000,000 shares of the par value of $1 each. The original owners of the mining claims involved will be given 900,000 shares, while the holders of the 300 syndicate shares will be alloted 600,000 shares. This will leave the company in full ownership of the property, with exploration work paid for and with 1,500,000 shares remaining in the treasury with which to finance further work.

The plan is one that is commanding favorable comment, as it places within the reach of prospectors an opportunity to explore their property thoroughly and to share in the final result.

An encouraging report has been made on the property of the Porcupine Mutual Gold Mine Syndicate by J. H. Rattray. It is recommended that the diamond drilling should be done in an effort to locate the continuation of ore shoots which occur on the same vein on the Hollinger Reserve. In conclusion, Mr. Rattray says:-

"Expenditure in carrying out the above recommendations must be regarded as a speculation. You have however, a reasonably good chance of finding profitable ore bodies. The cost of determining this chance by diamond drilling is comparatively small, and if sufficient payable values are encountered, you will realize profits commensurate with the risk involved."

Silver Production Increasing

The silver mining industry of Northern Ontario is rapidly reflecting the increased demand for silver and the gradual rise in quotations for the metal.

Nipissing, O'Brien, Mining Corporation, Coniagas and La Rose continue to produce at full capacity, while the McKinley-Darragh is now in full operation and with the Peterson Lake and the Dominion Reduction starting up. Added to this are favorable indications that the Beaver will resume shortly and good prospects of the Temiskaming Mining Company taking similar action provided the price of silver shows signs of becoming stabilized at the present high point.

In South Lorrain, the Keeley Silver Mines continue to yield silver at a rate that is second only to the leading producers of Cobalt, while the Mining Corporation is in a position of promise in respect to establishing another important operation adjoining the Keeley.

From Gowganda and Elk Lake comes optimistic news that would indicate more widespread activity in that direction.

Exploration of Ruby Property

Reports on the street would indicate that the Coniagas is meeting with considerable encouragement during the course of exploring the Ruby Silver Mines by diamond drill. Geologists believe the possibilities of this neglected section are such as to warrant considerable work, and it would appear as though all that will be required to encourage a good deal of activity would be a rich strike on such a property as the Ruby.

Preparations have been made by La Rose to resume work on La Rose Extension, and the indications are that this may be developed into a substantial source of production.

Advertisements other than "Employment Wanted" or "Employees Wanted" will be inserted in this department at the rate of 20 cents per agate line (14 agate lines make one inch). $2.80 per inch, each insertion, payable in advance. Space measured from rule to rule. When four or more consecutive insertions of the same advertisement are ordered a discount of 25 per cent. will be allowed.

Advertisements of "Wanted Employment" or "Wanted word, net. Cash must accompany order. If box number is used, enclose ten cents extra for postage in forwarding replies. Minimum charge 50 cents.

Employees" will be inserted at the rate of two cents a

EDITORIAL

The fuller and more accurate the knowledge which the geologist has of kindred branches of inquiry, the more interesting and fruitful will be his own researches. From its very nature, geology demands on the part of its votaries wide sympathy with investigation in almost every branch of natural science.—Sir Archibald Geikie, 1879.

CANADIAN FREIGHT RATES AGAIN

In our issue of May 26th we reviewed that anachronism, the Crow's Nest Pass Agreement. That the Agreement is unsuited to present conditions is, naturally, a proposition strongly maintained by Canadian railway executives, and they are entirely right in their contention that is is discriminatory and far too limited in its application. At this conjuncture we observe with much pleasure that Government and railway managements agree that drastic action is needed to give trade and commerce relief.

A few days ago an authorized representative of the railways submitted for the consideration of the Parliamentary Special Committee a definite plan for the reduction of freight rates. That plan embraces the formation of a special tribunal empowered to regulate and control freight rates. On the selection of the *personnel* of this tribunal will depend its efficiency. An immediate reduction in freight rates charged on the raw products of agriculture, mining, lumbering and fishing is recommended "wherever these commodities form the staple source of production and employment." This limiting clause, quoted from the railways' memorandum, is not altogether to our liking. Low freight rates are desperately needed in many parts of Canada to *make* mining a source of employment.

In the term "basic commodities" are included grain from the Northwest Provinces (again, why the territorial restriction?), all forest products, and all ores, coal, coke, building material, brick, cement, lime and plaster, fertilizer, wire rods and scrap iron.

The gravely involved state of our National Railway finances is a warning against unconsidered action. But whatever changes are made will and must apply equally to all operating lines. It would be the height of folly to discriminate against the Canadian Pacific. Hence, the prime considerations are, first, the immediate effect that reductions in freight rates will have upon the weaker lines, and, second, the result over a period of, say, two years. The latter consideration is of greatly more import than the former. If, for instance, lower rates stimulate the production of minerals (and we *know* that this will be the case), then the loss to the railways will be but temporary. The ultimate gain to the country at large will be immeasurable.

It is from this point of view that the problem should be approached. Candour compels us to state that Parliament displays an inexplicable inability to think straight in this matter.

In any case, the Railways have helped to clear the ground. For this we give thanks.

AMERICAN NICKEL CORPORATION

Canada's largest mining camp, the Sudbury nickel field, has probably reached a lower depth during the present depression than any other of the country's industries. Yet those conversant with the facts have never been doubtful of the ultimate resumption of the production and commercial use of nickel on its former scale, even though the Washington conference spoiled the better part of the former market. This confidence in the future of nickel has been held unshaken particularly by those familiar with the character and attainments of the men shaping the destinies of the respective nickel corporations. Recent events justify this faith.

Among the important developments noted lately, none has been more interesting than the reports that the Mond Nickel Company had solved the problem of producing malleable nickel. Now there is announced, through the twelve modest pages of a pamphlet, the fact that the American Nickel Corporation, of Clearfield, Pennsylvania, is prepared to produce and sell pure, malleable nickel, in various forms ranging from ingots and sheets to forgings and pipes. Evidently the metallurgists of the Mond Nickel Company have not been idle during the period when their regular activities have been curtailed. Likewise, Dr. C. V. Corless' frequent disappearance across the border during recent months is now adequately accounted for.

The first production of Monel Metal marked an epoch in the Sudbury nickel field, and therefore in Canadian metallurgy. The advent of malleable nickel is similarly important, and will, more than ever, carry the fame of Canada's nickel deposits throughout the world.

The properties of the American Nickel Corporation's new product, as set forth in their announcement, are quite unusual. The metal is at least 99 per cent. pure nickel. Cold rolled, it has a tensile strength of 100,000 to 150,000 pounds, an elastic limit of 80,000 pounds, and a yield point of 100,000 to 125,000 pounds per square inch, with an elongation in 2 inches of 10 to 35 per cent. and reduction in area of 20 to 65 per cent. Among the qualities noted are resistance to corrosion, erosion, oxidation, abrasion,

acids and scaling; it can be welded to iron or steel, or to itself, it is not affected by superheated steam or by liquid air; its colour is silver-like, it can be bent double, cold; it takes a high polish; and it can be forged, drawn, rolled and spun. Such a catalogue of qualities suggests innumerable commercial applications of the newly found metal.

It has become a habit with us of late years to welcome in Canada the establishment of branch factories of American firms. Here we have the beginning of a reciprocal movement that might will be carried further. The Mond Nickel Company will, of course, furnish all the material that the American Nickel Corporation will work into finished form.

The *Canadian Mining Journal* offers its congratulations to the men of the nickel industry who have succeeded in bringing it back thus far on the road to prosperity.

A MINE RETRIEVED

The Dome Mine, at Porcupine, has had a career of ups and downs. When the "Golden Stairway" was first uncovered, it seemed as if the Hollinger, along with all other prospects, and even mines, so far discovered would sink into insignificance. Many a prospector turned off the old portage trail to have a look at the wonder, and then struck off into the bush to try to locate an off-shoot of this mother-lode. Then came practical mining men, searching for a large tonnage of milling ore; and some of the shine came off the "Golden Stairway." Nevertheless, courageous investors, with their eyes wide open, took the chance that accompanies all mining development in varying degree. Their judgment and their temerity have been well rewarded.

After the first attempt at selective mining of the ore of higher grade, a policy of wholesale stoping was adopted. For a long time it was doubtful whether there would be any margin of profit. Eventually the cost of mining and milling was reduced to such a point that good profits were realized. Then, with the exuberance of new-born success, the management concluded that the mine was "made."

Disillusionment came when costs mounted during the wartime, and much of the ore was found to be unprofitably low in grade. Reserves of ore were found, on development, to be mainly reserves of quartz. Something had to be done. Mr. H. P. De Pencier was brought in to do it.

During the last year the fortunes of the Dome have taken another upward swing. Further development work has disclosed more of the irregular shoots of high-grade ore characteristic of the deposit. The mill heads have more than doubled in value, and the ore from development work is higher in grade than ore from the stopes. Dome profits are now at a rate never before reached, and a corresponding interest has been created on the stock exchanges. But the manager of the mine does not forget the mine's history.

The annual report of Dome Mines, Limited, for the year ending March 31st, 1922, is lucid and comprehensive. It can be studied with profit by those who wish to become well-versed in sound mining practice. The point to which we wish to draw particular attention is the fact that Mr. De Pencier has refused to estimate ore reserves. He gives unusually full data as to the development work that has been done and the pay-shoots delineated; but he considers it unwise to assure the directors of any ore-reserves that are not actually put in sight. There is at present a large reserve thus developed, and all evidence available warrants the statement that "we can confidently look forward to similar results" during the coming year.

To thus read the Dome's past history into its future is, no doubt, the only policy in accord with sound mining practice. There is every temptation in the mine's present condition, to go to an extreme of optimism, and to assume that the hard times of former years will not recur. Those whose chief concern is the stock market and not the production of bullion would have us believe that the Dome's present daily supply of gold is a permanency. This may be so; but shrewd engineers and knowing investors will not depend upon it.

Mr. De Pencier has now an enviable reputation as a shrewd and progressive mine operator. He is subject neither to coercion nor to undue influences. This latest refusal to speculate as to Dome's ore-reserves is completely to his credit. When Canada shall have developed more mining engineers of Mr. De Pencier's calibre and qualifications, her mining industry will more rapidly be put upon a firm and profitable basis.

PERSPECTIVE AND PETTUS

The Chinese honour their dead generations; we forget our predecessors. In our overweening pride and self-absorption we forget all save the present. We are the heirs of all the ages, yet we know next to nothing of our heritage. To lapse into the vernacular, it behooves us to get "wise" or "hep" to what was done before this terrestrial globe was honoured with our presence.

On another page of this issue will be found one of a short series of articles on Sir John Pettus, a mining man who flourished in the seventeenth century. Those who have read a little history know that in that period, the sycophant, the lickspittle, and the human satellite were distressingly numerous. The man of letters was foredoomed to failure if he could not find a patron. The man of science was in pretty much the same plight. The sciences themselves were still deeply encrusted with superstition and charlatanism.

Pettus, weighted though he was with the errors and prejudices and ignorance of his times, nevertheless was an enterprising and public-spirited citizen. His book on which the articles referred to are based, is a landmark in the history of technical literature. No doubt at all is there that it helped many an earnest young assayer to get his start in life—and the young man would deserve it, for Pettus was not the clearest or most accurate of writers. But there is this to be said for Pettus,—he

was a consistent optimist. Also he evidently possessed much charm of manner, for the Governor of Fleet Prison, Richard Manlove, Esq., who was his patron, helped him most substantially, although Pettus was enduring an habitation enforced.

We had thought to point a moral in this short editorial. But morals really should not need pointing out. It suffices to say that our real wish is to inspire some few of our readers with a genuine love of old books. Modern text-books do not contain all that is to be known of mining. A constant diet of up-to-the-minute literature entails excessively unpleasant consequences. In a word, one can get too much of a good thing, even of journalistic moralizing.

LESE-MAJESTE

Late in May the president of one of our large banking institutions, addressing the shareholders in annual meeting assembled, reviewed the business situation, dwelling at some length on manufacturing, farming, railways, and taxation. Mining he dismissed in this laconic sentence: "*Some branches of mining are yielding returns!*"

Now we happen to know that the bank in question has, ever since the discovering of Cobalt, had its deposits augmented by many millions of honest mining dollars, and these dollars have not been idle. It is not overstating the case to say that this particular bank would occupy to day a decidedly less secure position had it not been for the large business brought in by its mining *clientele*. Yet mining, an industry second only in present importance to agriculture, and by no means second to agriculture in future promise, is accorded nothing more than some words of the faint praise that damns!

Truly this is not edifying. What must or can we think of the vision of financial leaders when such utterances are possible? It is the duty of the whole mining fraternity to enlighten those who dwell in such perilous darkness.

EDITORIAL NOTES

More than any other branches of industry, mining and metallurgy are being nurtured and cared for by the German Government. German efficiency is not wholly a discredited fetish. The Teutonic mind has, at least, a sense of industrial values. Germany is far ahead of Canada in utilizing her mineral resources, although it is grievously true that Nature has endowed Canada with many times more mineral wealth than any country in Europe.

Parliament is shortly to be prorogued. The lately elected Government will then have lived through a voeferous session. We have read Hansard with praiseworthy assiduity. (This, we fear, is a redundancy, for no normal being can read Hansard without assiduity.) On more than one occasion topics touching directly on mining have come before the House. Not once have they excited even a simulated interest. For many years there has been no evidence to show that there is in the House of Commons a single representative adequately informed as to Canadian mining.

In the still watches of the night we have often wondered why ministers of the gospel are so susceptible to the blandishments of the wrong kind of mining promoter. One prime reason may be, no doubt is, the disparity in the rate of exchange (so to speak). Spiritual advice and comfort and guidance command low prices. The preacher's stipend is exiguous, excessively so. But this is not the only cause. Preachers, in the nature of things, have less worldly wisdom than most of us. To balance matters, they have so much other-worldly wisdom, and we so little, that they naturally become dogmatic and pragmatic in affairs spiritual. Now, as there is none more pragmatic than the off-colour promoter, and as mining is outside the preacher's ken, the appeal is irresistible.

Today we print, by courtesy of Dr. W. H. Collins, Director of the Geological Survey, Ottawa, an account of the work to be conducted during the coming season. The activities of the Survey are always of interest to those of the mining profession. This interest might properly be extended in much greater degree than at present, to the general public. All too few of our citizens know anything about the current activities from coast to coast of the men who contribute so much to building the foundations of the mineral industry, from which each member of the public benefits so largely. In spite of the pressure of work incidental to putting his 39 parties in the field, Dr Collins has found time to prepare this statement for the mining men of Canada.

Announcement has been made of the shipment of an unusually large consignment of copper nickel matte from the smelter of the Mond Nickel Company at Coniston, Ontario. With the re-opening of the International Nickel Company refinery at Port Colborne, this augurs well for the early resumption of activities in the Sudbury nickel district.

MONODI.

To the orators at Ottawa these lines do I indite —
Our natural resources, they are undeveloped quite'
I've heard this in the morning, and I've heard it in the night;
The way in which our orators expound it is a fright,
They talk in periphrastics, which, I take it, is their right;
But phrases get us nowhere when we all are sitting tight
Neglecting opportunities and shutting out the light
It is action that is needed to relieve our grievous plight'
So I pray the powers at Ottawa to take this as a slight,
To regard it as a thistle, situated where 'twill bite,
And to give us fewer phrases — but to gird their loins and fight
For rational development with their whole devoted might'

ANON

Field Work of the Geological Survey, 1922

W. H. COLLINS, DIRECTOR

Thirty nine parties will be placed in the field in various parts of Canada this summer by the Geological Survey. These parties range in size from three to eleven persons. Twenty nine will do geological work and ten topographical work. The most westerly one will be located in Yukon territory, and the most easterly in Nova Scotia. The northernmost party will work in the Mackenzie River region in latitude 66, just under the Arctic Circle.

In large part this work is aimed to give assistance to prospectors and explorers in the discovery of mineral deposits. Several of the parties are directly engaged in a detailed inventory of Canada's resources of coal, iron ore and other minerals. Nearly all, and more particularly the topographical parties, are contributing to the exact and fundamental mapping of the country according to standards as closely accordant as possible with the standards of other Government survey departments. The need for precise topographical maps for mining operations, forestry and soil surveys, highway development and general engineering purposes is becoming rapidly apparent, especially in the areas of rapidly increasing population in southern Canada and the prairie provinces. Two of the thirty-nine parties will be engaged in collecting mineral specimens and fossil remains for the Victoria Memorial Museum.

Besides results of direct value, the Survey obtains a mass of what may be designated negative information, the value of which is not always fully appreciated. It is of economic interest to the prospector in search for certain minerals to be warned against wasting his time in looking over certain areas in which these minerals are not at all likely to be found. It is also of economic interest to the investing public to know that certain ore-deposits cannot occur except under certain known geological conditions. One of the first tasks of Canadian geologists was to show that no coal fields, similar to those of Pennsylvania, need be looked for in the provinces of Ontario and Quebec. The Geological Survey and the Department of Mines, Toronto, have for years been informing the inquiring public that the anthraxolite which occurs in a fissure in the rocks north of Sudbury is not coal and should not be taken as an indication of the occurrence of coal, and have pointed out the futility of carrying on boring operations with the expectation of finding coal seams.

Concurrently with the investigation of ore-deposits an opportunity is afforded to most parties to carry on the purely scientific investigations which each year help to transform the exploration of our mineral resources from a haphazard search to one guided by increasingly well-recognized principles. For example, it has become well recognized that the vast series of intrusions of granitic rocks that forms the Coast batholith, extending along the Pacific coast of British Columbia, was the source of a large share of the metalliferous ore-deposits which occur in its vicinity. The two large copper deposits that are now being worked at Britannia Beach and at Anyox had their source in this intrusive body. Other ore bodies such as the Premier, the Dolly Varden, the Surf Inlet, etc., owe their origin to the same intrusive. The geological Survey has carried on investigations for a number of years in the Coast Range batholith.

BRITISH COLUMBIA & YUKON.—Work will be continued along the Coast batholith this summer with the object of mapping more particularly those areas in which the granitic mass comes in contact with the older formations and in which conditions have been provided favourable for the deposition of mineral deposits. *Dr. Victor Dolmage*, who has been engaged for two years in mapping the western edge of the Coast batholith along the Pacific coast, will continue his work northward to join up with that already done by R. G. McConnell, S. J. Schofield, and George Hanson, in the Observatory Inlet and Portland Canal areas.

Dr. George Hanson, who made a detailed study of the geology and gold and silver ore-deposits of the Upper Kitzault River area last summer, will map part of the eastern contact of the Coast Range batholith. He will also examine the geology of the Kitsumgallum valley where the possibility of the occurrence of petroleum-bearing rocks has received some attention on the part of the public.

The northward extension of the batholith into Yukon territory will be studied by *Dr. W. E. Cockfield* and an area in the southern part of the territory will be mapped to show more particularly the contacts between the batholith and the intruded rocks. The copper deposits of the Whitehorse district and the gold-silver deposits of Wheaton district in all probability had their origin in mineral-bearing solutions given off by the Coast Range intrusives. The summer's work of Dr. Cockfield should result in delimiting other areas favourable to prospecting.

In the southern part of British Columbia *Dr. C. E. Cairnes*, who spent two field seasons studying the ore deposits and general geology of Coquihalla area, near Hope, will extend his investigations southward for the purpose of correlating the geology of the Coquihalla area with that of the Similkameen and Tulameen valleys and the International Boundary. Attention will be given to the distribution of the peridotite rocks from which the platinum placers of the region have been derived. He will also spend part of the season making further investigation of the gold ore-deposits at Hedley.

Dr. J. D. MacKenzie will continue the detailed mapwardping and study of the underground structure of the Comox coal field which he commenced in 1921. The northward extension of this field will be examined and its relation to the Nanaimo field will be studied. The results of the season's work should be of material aid in the exploratory drilling of the coal-bearing areas. Data regarding the resources of the coal field will be contributed to the general study and inventory of the fuel resources of Canada.

Surveys for a contoured map of this coal-bearing area are being made by *Mr. A. C. T. Shephard* with a view to getting out a map of the Comox coal fields on a scale of 1 mile to 1 inch and a contour interval of 50 feet. The district is one of growing population and productivity in which a topographical map will serve many

purposes besides aiding in the exploration of the coal basin.

Interest in the placer gold deposits of Cariboo district has quickened during the past year and fresh discoveries of gold have been reported. The placer deposits are nearly altogether Tertiary in age and have since been obscured by glacial action and a covering of boulder clay, a condition which renders prospecting unusually difficult and calls for a careful geological consideration of the pre-glacial drainage of the area. *Mr. W. A. Johnson* will visit Cedar Creek, where the reported discovery of rich placers has led to a rush of prospectors. He will also complete his work on the placer deposits of Barkerville area. An investigation of the underlying bedrock, from which the placer gold must have been derived, will be made by *Dr. W. L. Uglow*, of the University of British Columbia, and a report on both placer and lode deposits will be made. This will be accompanied by a large-scale map.

In the Lardeau *Mr. M. F. Bancroft* will continue his study of the silver-lead-zinc, talc and other ore deposits and will conclude his investigation of the stratigraphic and structural features of this area, which furnishes one of the most interesting and one of the most difficult pieces of field work in British Columbia. Work in the Windermere area, East Kootenay, will be continued by *Dr. S. J. Schofield*, of the University of British Columbia. The mineral deposits will be examined and a careful study made of the stratigraphical relations of the Pre-Cambrian and early Palaeozoic sediments. This work is part of a scheme of geological mapping which is aimed to correlate and unify the many isolated pieces of geological work in southern British Columbia and permit of the compilation of one general geological map of this region. *Mr. R. Bartlett* will this year continue topographical mapping of an area along Kootenay lake, in which the correlational work of Dr. Schofield will be continued.

Dr. G. A. Young, in cooperation with the Department of Mines of British Columbia, will begin a detailed investigation of the iron-ore resources of the province. It is proposed to study and inventory the iron-ore deposits in a manner that will admit of determining whether there are enough ores suitably located and of satisfactory qualities to supply a future iron and steel industry on the coast if other essential requirements for such an industry are obtainable. The proposition of establishing a Coast iron and steel industry has been under consideration at various times in recent years and there is a distinct need for exact information regarding the basic requirements.

Surveys for a detailed topographic map of Copper mountain and vicinity will be made by *Mr. H. A. Nichols*. This will include the properties near Allenby, where extensive developments of copper deposits have been carried on and where large low-grade bodies of ore have been proved. It is contemplated that the topographic mapping will be followed in 1923 by a geological investigation of the area.

Dr. L. H. McLearn will do detailed geological work along Peace river above Hudson's Hope, with a view to obtaining accurate geological sections of the Triassic and Cretaceous formations. These formations are being drilled for petroleum by the government of British Columbia and by private companies and information is much needed regarding the succession, character and thicknesses of the formations that are being thus explored.

MACKENZIE DISTRICT.—In 1921 the Geological Survey, co-operating with the Topographical Surveys Branch of the Department of the Interior, commenced a systematic mapping and investigation of the petroleum-bearing possibilities of the country accessible from Mackenzie river. Three parties will continue this work during 1922, surveying canoe routes, and determining the geological succession and structure and oil-bearing possibilities of the sedimentary rocks of this area. *Dr. G. S. Hume* will carry on work of this nature in the country in the vicinity of Mackenzie river below Norman and along Carcajou river. *Dr. M. Y. Williams* will work east of the Mackenzie between Wrigley and Great Bear river. *Mr. E. J. Whittaker* will work between Providence and Simpson.

ALBERTA.—*Dr. D. B. Dowling*, at the request of local residents, will investigate the underground water resources of a dry area near Peace River, Alberta. In 1915 Dr. Dowling outlined a considerable area in the southern part of the province in which a supply of artesian water should be obtained by boring to an underlying porous sandstone known as the Milk River sandstone. This formation, which is exposed on Milk river and which derives its supply of water from the river, dips northward beneath later sediments at a low angle. A number of borings were made and an abundant supply of good water was obtained. Dr. Dowling will also make a general inspection of drilling operations for petroleum and natural gas in southern Alberta, and will investigate reported discoveries of placer gold and platinum in Red Deer river.

Mr. John R. Marshall will continue a systematic geological mapping of the coal fields of Kananaskis river where important coal seams of Kootenay age are found.

Mr. W. H. Miller will continue field work in the Mountain Park area of western Alberta for the purpose of making for subsequent geological work a topographical map on a scale of 1 mile to 1 inch. This is in one of the important coal fields of the province.

SASKATCHEWAN AND MANITOBA.—*Dr. E. L. Hoeck* will map in detail about 50 square miles including the Mandy copper deposit and Flinflon gold deposit. A similar detailed map will be made of the gold bearing area around Elbow lake. The known ore deposits in each area will also be investigated carefully. It is aimed to provide good geological maps of the areas in which intensive prospecting is being carried on and to accompany these maps with reports indicating the character and mode of occurrence of the various types of ore deposits, and the extent of their development.

Dr. J. F. Wright will commence the systematic geological mapping on a scale of one mile to the inch of the "Keewatin" areas east of Lake Winnipeg. Last year Dr. Cooke made an intensive examination of the copper-nickel ore deposits at Maskwa river and Oiseau lake and of the gold deposits at Rice lake and indicated in his report (Summary Report 1921, part C) issued that those deposits are genetically related respectively to certain gabbro and later granite intrusions. Particular attention will now be given by Dr. Wright to mapping in other parts of the region these formations which are of such significance to prospectors.

Mr. R. C. McDonald will commence a series of accurate control surveys in northern Manitoba with the

ultimate object of compiling and issuing a general geographical and geological map of the northern part of the province. It is recognized that prospectors and explorers require a good general map of the whole region in addition to the various detail maps of mineralized areas which have been issued by E. L. Bruce and F. J. Alcock. A feature of particular interest in connection with Mr. McDonald's work will be assistance given by the Air Board of Canada in making reconnaissance flights and carrying supplies to points otherwise difficult of access.

ONTARIO.—Dr. T. L. Tanton will continue mapping the section of country lying to the north of Lake Superior between Port Arthur and Nipigon. The Animikie and Keweenawan formations of this district contain ore-deposits of silver, iron and zinc. Other economic minerals are also to be found. *Mr. E. E. Ferdaud* will make a topographical survey for a map on a scale of 1 mile to 1 inch of Port Arthur, Fort William and vicinity. This map should fill many engineering and other needs of this important centre of population. It will also be used as a base map for a thorough geological survey of this interesting and economically important locality.

Mr. Ellis Thompson will continue his systematic geological mapping in Michipicoten district. This district contains deposits of iron ores, pyrite and gold, of which the Murphy gold discovery southwest of Goudreau is one.

An area of Huronian formation near lake Panache, southwest of Sudbury, will be geologically mapped by *Dr. Pentti Eskola*. Dr. Eskola is a member of the Geological Survey of Finland, temporarily carrying on research work at the Geophysical Laboratory of the Carnegie Institution, Washington, and the opportunity of his presence in America has been taken to have him associated for the summer with the Geological Survey of Canada. The geological problems of Finland, which possesses a highly organized Geological Survey, are very similar to those encountered by Canadian geologists who work in the Precambrian shield, and a practical exchange of ideas between Dr. Eskola and Canadian geologists should prove mutually profitable.

The study of the radio-active minerals of Ontario, commenced by *Dr. H. V. Ellsworth* in 1921, will be resumed during the summer of 1922. Dr. Ellsworth will also commence a systematic investigation of the Canadian occurrences of the minerals of cerium, thorium, beryllium and other rare elements, known to occur in the pegmatites of southern Ontario and Quebec and in other parts of Canada. New uses for these elements and their compounds are being found. At the present time the Imperial Mineral Resources Bureau of London, England, has in hand the investigation of new industrial appications of these materials. As progress is made along these lines of research, more and more accurate information will be needed regarding sources of supply.

Dr. M. E. Wilson will continue the systematic geological mapping of the Precambrian formations in the vicinity of Madoc, Hasting county. A number of minerals of economic importance, such as fluor-spar, talc, pyrite, gold, actinolite and molybdenite, are found in this area. He will also visit talc and soapstone deposits in Ontario and Quebec for the purpose of completing data for the preparation of a report upon the talc and soapstone resources of Canada.

An investigation of the clays and shales of Ontario will be continued by *Mr. Joseph Keele* with a view to ascertaining how they may best be worked to obtain the most satisfactory results in the production of such commercial products as brick, drain tile, sewer pipe, etc. Mr. Keele has already surveyed most of the other provinces of Canada for this purpose and issued reports covering these surveys. A similar report will be made upon the clay resources of Ontario.

QUEBEC.—Since the discovery of the Dome ore-deposit at Porcupine in 1909, gold camp after gold camp has been discovered and developed in northeastern Ontario until today it is producing about $18,000,000 worth of gold yearly. The geological investigation of the Geological Survey and the Ontario Department of Mines have demonstrated pretty conclusively that these gold ore-deposits are connected in origin with small intrusions of granitic rocks, and are chiefly localized in the vicinity of these intrusions. So far, nearly all the important discoveries have been made in Ontario, although apparently the same geological conditions continue eastward into Quebec. This year *Dr. H. C. Cooke* will map on a scale of one mile to the inch an area of about 800 square miles in northern Quebec adjacent to the Ontario boundary, chiefly for the purpose of assisting prospectors in searching for gold in Quebec. The resultant maps, it is planned, will show all small granitic intrusions which can be found, all extensive areas in which bedrock is concealed by swamp or drift, and other geological and geographical features of practical concern to prospectors.

A survey of four important peat bogs in Quebec and Ontario will be made by *Mr. Aleph Anrep*, in continuation of a systematic survey of the peat resources of Canada.

Mr. K. G. Chipman will make surveys for a topographical map on a scale of one mile to the inch of part of Gaspé peninsula in the vicinity of the Federal zinc and lead mine. This topographical work is preliminary to a continuation of the geological work done in the locality by Dr. Alcock last year. The area is one of considerable interest to prospectors. It is underlain by sedimentary rocks cut by basic and granitic intrusives favourable to the occurrence of metalliferrous ore-deposits.

Mr. W. H. Boyd will make, for the Federal Department of Public Works, a detailed topographical survey of Matane harbour on the north coast of Gaspé peninsula.

MARITIMES PROVINCES.—A detailed topographical map of the Minto coal field, New Brunswick, on a scale of 1 mile to 1 inch will be made by *Mr. A. G. Haultain*. This is preparatory to a geological investigation of thefield.

Triangulation control for New Brunswick surveys, both for present and future needs, will be made by *Mr. S. C. McLean*.

Dr. E. R. Faribault will continue the systematic mapping of Nova Scotia on a scale of 1 mile to 1 inch. Work will be carried on during the summer of 1922 in Annapolis county, where early Palaeozoic sediments are found in contact with the gold-bearing series of the province. A detailed investigation will be made also of the Nictaux-Torbrook iron range, which occurs in this locality.

Dr. W. A. Bell will complete his work in the coal field of eastern Cape Breton, spending a short time in the New Campbellton area. He will then commence a detailed investigation of the New Glasgow area, Pictou county, for the purpose of working out the stratigraphic and structural relations of this coal field.

A Mining Man of Two and a Half Centuries Ago*

I. MINERALOGY AS IT WAS.

(Written for the Canadian Mining Journal.)

All wisdom did not die with the ancients, nor will it die with us. Every generation has had its torchbearers, lights that have burned with undiminished glow throughout succeeding ages, or flickering flames that have illumined a corner of the dark world for a little and died out.

* * *

Sir John Pettus, of Suffolk, Knight, was born in the year of grace 1613. For 28 years, 1651-1679, he was one of the Deputy Governors of the "Society of the Mines Royal and Battery-Works," of which august body Viscount Halifax was then the Governor in succession to his "late Highness Prince Rupert." Reference to the functions of this Society will be made later. Sir John engages our immediate attention.

Although he was a stout cavalier and royalist, Pettus was thrown into the Fleet prison in the year 1683, for debt, when he was 70 years of age. He had previously undergone 14 months incarceration in Windsor Castle in the time of Cromwell because of his Jacobean sympathies. His confinement to the Fleet he attributed to his "being too kind to others, and too unjust to my self, and for not doing what was not in my Power to perform, by wanting the Justice of my Debtors whereby I am rather a Prisoner to them than to my Creditors." Sir John, however, was a philosopher. He struck up a warm friendship with Richard Manlove, the Warden of the Fleet Prison, and went so far as to persuade Manlove to give him pecuniary assistance in publishing a translation from the German of Lazarus Erckern's "five books" on assaying and metallurgy. To the translation he added a glossary compiled by himself.

Every bit of the translation, a large folio of 345 pages, is pregnant with interest. In this article it is intended to survey only those parts of the treatise that deal with the science of mineralogy as it was known in the reign of King Charles the Second. In doing this we shall follow the order observed by the translator, namely, first silver ores ("oars" is Pettus' mode of spelling); than gold ores; copper, and lead.

Silver Ores

"Silver Oars," remarks our author, introductorily, "are found to be of many sorts and Colours, yet if they be very fine, they are not to be judged by their Looks (how rich soever they are in silver) and therefore 'tis proved by Artists... that the worth of every Oar may be certainly found out, so that the very smelting, melting, refining and account thereof may be demonstarted both as to its worth and the Charges."

It is carefully explained that silver ores of various kinds must be variously tried according as they are "hard, harsh, gross, and crude," or "of a more mild, subtil and ductile nature." Then follows the system of classification evolved by Erckern.

First come the "Easy-flowing Silver Oars," in which category are comprised "all Silver Oars in all sorts of Mynes free from Flint, Blent, Cobolt, Mispickle, Glimmer, Wolferan, course [sic] spelter and Wismet." Pettus in his glossary, defines more closely these constituents that must be absent from "mild oars." "Metaliek *Flints* (Silix) are such as accompany the Veins of Metals." *Blint*, or blend, is found "when Metals are blended or mingled in lumps." *Cobolt* is "sometimes accounted to be copperstone, and reckoned by Dr. Salmon among the Recrements of mettals." "Recrement" here evidently signifies a product of weathering. Sir John's attempt at defining "mispickle" is a pretty obvious bluff. "I know no other word for it" says he, "but it may be derived from the next word." The next word is "Missy", indicating, we are told, an ore sparkling like gold. "So as I conceive" quoth Pettus, "Mispickle is an Oar of the same nature, only spotted." Despite his "Oars", the Knight is at sea. But he is admirably non-committal. *Glimmer* is "a shining Oar... and sometimes it is taken for Tallow." This last remark throws much more light on the subject than a learned etymological discussion that precedes it. *Wolferan* is omitted from the glossary. This surely means that Sir John could not make even a guess at its meaning. Moreover, he was coming close to the end of the alphabet. *Wismet*, as might be expected gisnifies bismuth, "a Crude Oar or kind of Silver Marchasite, and of a white, hard and brittle Body." It was variously wismut, wisunth oar and spelter, and sometimes tin glass.

We can grasp now the fact that silver ores were divided into two classes, those that were easily smelted and those that were refractory. "All spady Oars (or such as may be dig'd with a Spade) if they be red, green, yellow or white (if there be no other mixt silver Oars with them) for the most part do contain little or no silver in them."

In the quotations given above we have fair specimens of the determinative mineralogy of the time. Two and a half centuries had to elapse before a Dana could be produced.

Gold Ores.

"This Second Book describeth how Gold oars are to be known, and how to Roast, Boil and Prove them.... also to distill Aqua Fortis, and to rectify it."

"Experience" led the author astray. In his second paragraph he asserts positively that "no Oar hath Gold only of it self, without other incorporated Metals, unless it be apparent and seen." Admitting that native gold is not always pure, he explains that it is found "intermixed or commonly standing in a whitish Flint, and sometimes in a blew and yellow Hornstone, and also in a Blew shiffer streaky and yellow iron, but very small and flaming with gold." Readily enough we can distinguish quartz and weathered carbonate in this comparatively lucid description. Added light is thrown on the meaning when "shiffer" is explained as denoting ores that are loose and easily broken. It is mentioned that "Duke" gold, a very "high" form of the metal, comes from a mine in Bohemia. However, "all Goldish oars (which are commonly sandy) have good Duke gold," which gold, along with tin and wolfram,

* A short article on Sir John Pettus from the same source, appeared in a contemporary publication three or four years ago.

Mr. C. H. Sternberg, who has been so successful in collecting the fossil remains of dinosaurs in Alberta, will, during the summer, visit the Joggins section, Nova Scotia, for the purpose of collecting plant remains and preparing a museum exhibit to illustrate the forests that existed there during the period of coal formation. *Mr. Allan McKinnon* will make museum collections of minerals in the maritime provinces, Quebec and Ontario.

"have been driven far by the Deluge." The reference to alluvial deposits is clear enough. But at this point the author digresses into an involved speculation as to the origin of alluvial gold, which is very poorly translated.

Returning to his mutton, he continues:

"Sometimes with the digg'd Gold... there breaks a small grey spissy Oar, which... is called Iron-man," which is rich in both gold and silver. (Note the calm manner in which the author contradicts himself.) This, we are warned, must be carefully distinguished from "the other digg'd Gold which standeth in Flints." Here is foreshadowed the distinction between free milling and refractory gold ores. With a word in favour of "Marcasite" (properly spelled this time) the elucidation of the nature of gold ores stops abruptly.

Copper Ores

"Now" we read "Copper Oars are more easily to be known than any other metallick Oars, as having in them varieties of Colour." They are of three sorts:—First, copper glass, which is numbered among the "deft and smooth flowing Copper Oars" that are "blewish, (and yet their colour come near to Grey) and are the richest Copper Oars, and contain the most Copper and Silver." Secondly, the "green Coppers which are rich in Copper but poor in Silver." So also the "lazare coloured Copper or blew and Green-mixt copper-Oars." Thirdly, "the brown copper Oars" and the "copper shiffers" in which there are resemblances to "corporeal Creatures," such as fishes and snails. In brief, all ores that are not "flinty or speizy (spissy)" are soft-flowing.

With this outline the budding mineralogist of the seventeenth century was fain to be content.

Lead Ores

"Concerning Lead oars they are usually to be well known among the other Metal oars, for they are mostly grey, heavy, bright of colour like the Lead it self... and such bright colored Lead oars are the richest, and contain above half lead." White lead ore, like a sandstone, and red lead ore, not so rich, a yellow ore and a mixed yellow and red ore are included in the list of "smooth-flowing" sources of the metal. The poor ores, we are informed, are taken from "flinty, blendy or mountainous places, and are either visibly or invisibly insperged or sprinkled with brightness (like the Lead oar at Goslar) and are very heavy... yet they do partly separate and purify in beating and washing, but partly they do stick fast in the water, that one with the other remain unseparated." The lead metallurgist assuredly had to do a bit of investigating for himself. Yet, read in the light of modern knowledge one may detect the adumbration of systematic classification even in this hasty sketch.

The fifth book treats of "Saltpetre, Vitriol, Allum and Salt-Springs," and therefore does not concern us at present.

In a succeeding article we shall glance over the methods of assaying described by Erckern and commended by Sir John Pettus.

CAPRICORN.

A HOME-MADE PNEUMATIC DRILL-PRESS

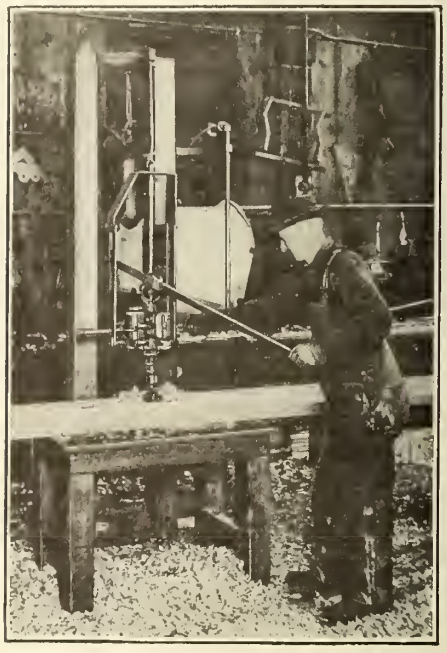
By F. A. McLean

There is a far wider field for the use of air-operated tools such as riveters, chippers, drills, grinders, saws, etc., around the average mining property than is commonly realized. Construction work is in a western mine, for instance, involved the drilling of several hundred 4 x 9 inch timbers for use as shaft guides. Experience soon proved that to do this work by hand was both too costly and too slow. The master mechanic, therefore, endeavoured to find a better method and finally rigged up a Little David Drill to form a crude, but nevertheless efficient air-operated drill-press. With this equipment the holes were drilled at an enormous saving in both time and cost.

The timbers were partly of oak and partly of Oregon fir, 10 holes being drilled in each with almost equal ease. A Jennings counter-sunk bit was used, the 7-8" portion going through 4 inches of wood and the 2-½ inch follower boring 1½ inches.

It is evident that an outfit of this kind could be adapted to a wide range of work such as metal drilling, reaming or tapping, woodboring, countersinking, etc., and the cost of building would be very low.

Referring to the accompanying illustration, it will be seen that the drill-press consists essentially of a heavy wooden bench to which two 4" x 4" oak posts or risers are bolted. These posts are connected at the top by a



heavy iron strap, which also forms a bearing for the counter-weight pulley.

Light iron strips are bolted to the posts to support the drill and prevent the holes being bored out of alignment.

A long lever hinged to the wall at the rear of the bench and fitting over the handle of the drill permits the latter to be raised or lowered as desired.

Considerable variation in the actual construction of an outfit of this kind could be made without affecting its operation, so that the nature and arrangement of the parts used need only depend on the ingenuity of the builder in adapting materials at hand.

OIL SHALE OF PICTOU, NOVA SCOTIA

Recently there has been shipped to London a large sample lot of the oil shale and oil-bearing torbanite of Pictou County, Nova Scotia. Retorting experiments and the refining of the resultant oils are to be carried out with this shipment of shale, in units of commercial size. It is expected that there will follow immediately the construction of a commercial plant in the field, on which work is to be commenced this summer in order to have cover provided for next winter.

This experimental work is being carried on under the supervision of the technical advisers of two London oil groups. The property is owned by Oil and Nitrate Products, Limited, of which Mr. Harold C. E. Spence is President and Managing Director.

A Problem in Crushing

THE MILLING OF ASBESTOS ROCK

At the end of last month, a meeting of the Thetford Branch of the Canadian Institute of Mining and Metallurgy was held to discuss the crushing of asbestos rock. Besides a representative gathering of the camp's operators there were present a number of visitors who have made a special study of crushing problems; in fact, the meeting was organized to take advantage of what information these latter had to offer, as well as to consolidate local opinion on the question. Mr. Roger Burrell, representing Chalmers and Williams of Chicago, provided a good deal of definite information, which opened the way for a clearer comprehension of the crushing problem. Chalmers and Williams manufacture a wide range of machines for crushing rock, and confine themselves to that line. Hence Mr. Burrell's estimate of the crushing of asbestos rock is free from the bias that might influence the advocate of a special machine. Messrs. H. A. Burbank of the Canadian Ingersoll-Rand Company was able to draw upon his experience in the asbestos field, and stimulated a good deal of profitable discussion. Mr. R. K. Carnochan, of the Mines Branch, Ottawa, told of experimental work on asbestos rock he had done.

The chairman of the Branch, Mr. N. R. Fisher, was ably seconded in stimulating and regulating discussion by Mr. J. W. Davis of Montreal, who has made the asbestos field his especial study for years past. Dr. Robert Harvie of the Geological Survey, who knows more than any other man about the Quebec asbestos field, and the editor of the Canadian Mining Journal "were also present".

Saving the Long Fibre

The first asbestos obtained for the Thetford district was turned up with a plow. Thereafter, pick and shovel served for some time as the chief equipment necessary. There was then a market for "crude" only. Since that time, and until quite recently, "crude" has been the main consideration in most of the asbestos quarries, and in fact "crude" controlled the market.

This situation is rapidly changing. Just at present there is little or no sale for asbestos of the larger sizes, while for the products of the mills there is a fairly brisk demand. So now it is natural that more attention should be paid to the recovery of fibre, not by hand-picking in the pit as is done for "crude" but by the milling of the rock.

Other things being equal, the longer the fibre the more it is worth. It is generally conceded that the present milling practice cuts and breaks the fibre into much shorter lengths than are contained in the original veins. This entails a loss of possible profits that in the aggregate involves a large sum annually. The object of a majority of the operators of the camp is now, by concerted action to discover ways and means of avoiding at least part of this annual degradation of vast amounts of good fibre into lower grades.

Crushing and Fiberizing

Asbestos in its natural state is hard and rock-like, but has a tendency to split into fibres. As the accepted method of collecting the fibre in the mill is by suction from shaking screens after crushing, it must be in the separated or fiberized condition at that stage. But to loosen the rock like vein material into fibrous form before all the crushing of the enclosing rock has been accomplished is to expose the loosened fibre to cutting action in the crusher. Hence the object of the mill must be, first to crush the rock and vein material sufficiently finely, and in such a way as to loosen from the barren rock the particles of vein material without fiberizing; and second, to effect the fiberizing mainly (and if possible wholly) after the ore has been reduced to the small size. By this means the fibre will be protected from breaking and cutting during the crushing period, on account of being itself still in rock like particles.

This is, of course, a counsel of perfection; it is impossible to crush the ore without producing a certain amount of fibre. Still the ideal should be kept in mind, and every possible effort made to approach the ideal, for that ideal means vastly increased profits.

Photo by courtesy of F. A. McLean

MEETING OF THETFORD BRANCH CANADIAN INSTITUTE OF MINING AND METALLURGY

Front Row — W. M. Goodwin, R. E. Burrell, N. R. Fisher (chairman), Prof. Hammerich, O. C. Smith
Back Row — G. W. Morrison, Geo. Dick, Jr., McLeod, Jas. Ferguson, Geo. Smith, R. K. Carnochan, J. W. Davis, Robert Harvie, W. A. Jamisch, W. A. Clearihue, J. E. Tregunno, H. A. Burbank

Requirements of Crushers

At the conference on May 29th, discussion was limited to the crushing problem. Fiberizing is a separate problem, in spite of the practice that still persists in some mills of deliberately combining the two stages of treating the rock.

The object to be pursued in crushing is, as outlined above, to reduce it in size with a minimum production of fibre. This can be effected best by a machine such as will give a minimum of fines. Any crusher with a grinding action is ruled out at once, as its movement produces a considerable amount of fines. Also, a crusher that reduces a piece of rock by too great a movement in one stroke will produce much fines on account of internal attrition in the rock being ground. Similarly a choke feed, or a slow discharge of crushed material is conducive to the production of an excessive amount of fibres due to this same attrition of particle on particle of ore.

Now, to outline some of the qualities to be possessed by the ideal crusher: It should reduce the ore in such a way as to crack it open, allow the immediate discharge of undersize, and the immediate descent to a narrower part of the pieces that need further reduction. The frame must be unusually strong as the serpentine rock of the district is prone to pack in the crusher, and consequently is at times more difficult to pass through than a harder but more brittle rock would be. Just in passing, it may be noted that a good deal of this packing or stoppage of ore in the crusher seems to be due to an attempt to make too great a reduction in one machine; also a tendency to use a choke-feed.

The Stages of Crushing

Primary.—At present there is in the camp no quarrying or mining operation of sufficient daily tonnage to warrant the installation of a crusher of primary size. Such a machine is capable of reducing ore from steam-shovel size down to, say, 18 inches, and has a capcity quite out of keeping with present asbestos pit requirements. However, the time will undoubtedly come, and may not be far off, when it will be expedient, for the sake of economy, to operate in large units instead of the present comparatively small ones. Then the problem of a crusher of primary size will have to be met.

Secondary.—The largest crushers at present in use in the camp are 36" by 42" solid-frame jaw crushers or gyratorys of equivalent size. Both are doing excellent work so far as reducing ore is concerned; but the feeding of over-size material by means of a choke-feed, and the attempt to make too great a reduction is one step mentioned above, result in a lamentable cutting and grinding of the precious fibres. This stage, at present the primary crushing of the camp, evidently needs more serious attention than it has had heretofore. The present reduction is from a feed as large as the jaws will take down to, say, 4 inches — a tremendous duty for a single machine.

Tertiary.—This, the present secondary crushing of the camp, reduces the rock from approximately 4 inch. size to, say, 1 inch. Corrugated rolls, small jaw-crushers and gyratorys are used, with good results. Here again, choke-feed results in an inordinate grinding action and the destruction of fibre, and should be asssiduously avoided. The present practice, logically conducted, does not injure the fibre excessively.

An innovation in two of the mills is the horizontal Symons disc crusher, a cleverly designed mechanism of very large capacity that cracks the rock with a sharp blow, and provides an immediate discharge of undersize by centrifugal force. Its possibilities have not yet been fully investigated.

The Final Stage.—It is still a matter of dispute whether or not the final stage of crushing from, say, 1 inch to $\frac{1}{4}$ inch, should or should not be accompanied by a fibersizing action. Those who have conducted systematic research on the question state that the two operations should be kept distinct and separate; and as there has been adduced on the other side no definite evidence, but only opinion, we must accept the researchers' conclusion. It is in the final stage of reduction that most of the damage is done to the fibre. Ordinary crushers are not suitable. Innumerable attempts have been made to develop a satisfactory machine; but most of these attempts appear to have been directed by mixed motives—the desire to fiberize as well as to crush. The natural result is that the "hammer mills" and "jumbos" at present in use are neither logical in design nor effective in performance. A considerable amount of practical attention is now being devoted to this marked discrepancy in the milling of asbestos rock, and there is no doubt that the problem of reduction in this final stage will soon be effected in a way that will prevent much of the present tremendous waste of fibre.

Fiberizing the reduced particles of ore is a separate problem not discussed in the present instance. The "cyclones" now in use do good work; but they might do better. The collection, sorting into sizes, and testing of the fibre also presents opportunities for improved practice.

Altogether, it seems as if an era of systematic investigation of the milling problems of the Thetford asbestos region had begun. Other regions, in Rhodesia, Australia, Russia and the United States, are producing asbestos in larger and larger quantities. Still the odds in favour of continued pre-eminence are all with Quebec, and it is to the Thetford region that all eyes are turned when asbestos is mentioned.

THE SCHREIBER GOLD DISTRICT

The report of Mr. P. E. Hopkins on the Schreiber gold area, north of Lake Superior, is expected to be issued at any time now, by the Ontario Department of Mines. In the meantime, it is interesting to note progress in the area.

Mr. Geo. Glendenning, who holds under option the McKellar-Longworth claims on Schreiber Point, intends to instal a mining plant and to drive a 1000-foot tunnel on the shear-zone containing the gold veins of the property. This will test the narrow, rich veins contained in the shear-zone, and will give, at the end of the tunnel, a "back" of 400 feet, thus constituting one of the few cases in Ontario where prospecting by means of an adit is feasible. The Hartness claims, 2 1-2 miles east of Schreiber, have also been optioned to Messrs. Glendenning and C. A. Foster. They contain narrow quartz veins with high gold values.

The Jackson claim, adjoining the Hartness, has been taken over by Detroit interests. A tunnel is being driven along a narrow quartz vein that carries good values in gold.

The Canadian Ingersoll-Rand Co. have recently published, in pamphlet form, *The Lubrication of Air Compressors, Practice Recommended by the Compressed Air Society, New York.* In its eleven pages are given the qualities required for a lubricating oil suitable for air compressors; the heat generated; descriptions of both paraffin-base and asphaltic-base oil; the quantity of oil required; and instructions for cleaning lubricating systems. Copies of this useful pamphlet can be had on application to any of the Company's offices.

News and Comments

BY ALEXANDER GRAY

James H. Curle Bound for Hudson's Bay

That inveterate globe-trotter, James H. Curle, is *en route* to Hudson's Bay, one of the by-paths of the earth he has not yet given the once-over and a fluent description. Being a confirmed bachelor, he travels without impediments, or "encumbrances", as they are regarded by irascible landlords. Gifted otherwise, he goes in light marching order, his wanderlust being put to profitable account in the way of entertainment. He is a living refutation of the precept that "a rolling stone gathers no moss". He is a keen observer and acute critic. He will, no doubt, luxuriate in the interior of an igloo—and it would not be surprising if he beat Amundsen to the North Pole!

Capital That Will Need Asbestos

Americans are about to resume mining of asbestos in the Ural mountains, having arranged a twenty-year lease and agreed to give the Soviet Government ten per cent. of the output. Sooner or later it was expected that more or less of the Russian inferior grades would be on the markets, but they will find their level. Providing capital, chancing markets, and giving the government a participation of the sort outlined, may be communistically ideal. The capital will require insulation.

Students Visit the Gold Mines

Chaperoned by Professor Bell, a party of McGill students gave the Northern Ontario Gold Fields the once-over during the past few days. A fresh impression was obtained of the importance and magnitude of mines in the respective camps, including those of the Sudbury district. While at the Dome, the management revealed the contents of a safe. Since the company entered the area of enrichment from which its current milling rock is coming, enough specimens have been gathered to make a collection so rich that it is safer under combination lock. As a display, it is forcible testimony to the attractive sections from which it came. The mill feed at present is averaging around $14; so there is no need of extra special chunks in other than the strong box. Should the lower workings continue to disclose anything like this better grade, the policy will be pursued of putting it over the plates, leaving the large quantity of low grade for future consideration.

At the Hollinger properties the student party found the management concentrating on ball-and rod-mill tests. Hollinger workings were not visited, Professor Bell taking the position that "it is too much of a job to go through unless you spend most of the recess there". An excellent opinion is entertained of Kirkland Lake, the courtesies of the Wright Hargreaves having been extended to the party. Discarding the scholastic, Professor Bell says "that two mile break is 'some' break. To look at a lot of Kirkland Lake surface, you might think most of it is unfit for much—not even for good pasturage—but the developments going on promise to make more mines." Sustaining this qualified optimism is the recent improvement in values at the Bidgood and discoveries elsewhere in that vicinity. The chief trouble is the indiscriminate distribution of cheap shares, which will preclude many of those who hold them from profiting commensurately.

Oil Over The Border From Alberta

Insofar as it comes, it is distinctly hopeful to have it reported that oil was struck on Monday the 5th, about eleven miles south east of Coutts on the borderland. First, Kelvin, then Coutts (both historic names) bring Montana production nearer to Canada. Lethbridge and Medicine Hat, as a consequence, are expectant. According to newspaper reports, "Simburst Number One well struck oil at 1550 feet in the Kootenay sands. The well stands at a depth of 250 feet in the casing." At or about that depth, should quantity production be indicated, an oil field may be shared with Southern Alberta, where it would be thrice welcome. If the information forthcoming in the daily press is verified there should be some excitement below Medicine Hat and Lethbridge.

Chibougamou May Need Help

The disquieting report that the present Quebec Government is averse to expenditures upon transportation facilities which will assist in the prompt development of mineral areas in that province, will hardly help contemplated developments in the Chibougamou district. An English Engineer, Major Yuill, has just arrived, and is leaving with H. L. Blake, M. E., of Ottawa, for Chibougamou, where they will test "mineral deposits in the interest of a powerful financial group in London". It is said "gold, copper, iron and asbestos" are the objectives; but if Quebec authorities are to continue unresponsive to outlying areas and new mining enterprises, who will risk capital expenditure to attain production?

British Metals Have a Copper Mine

Private advices are to the effect that the British Metals Company have found a copper mine near Little Bay, Labrador, and that they are now drilling near Gull Pond. By diamond drill, it is understood, between 5,000,000 and 6,000,000 tons of 3 per cent. copper ore has been indicated. So that's that. Newfoundland is in front of the map, while Quebec authorities appear to have nurtured antipathy for mining of all kinds. Newfoundland invites exploration and development. Quebec has assumed a reactionary attitude that is sadly out of focus. More will be heard of this anon.

Canadian American Industrial Life

Upon his arrival in London, Attorney General James M. Beck, of the United States announced that "economically Canada is becoming more and more interwoven with the industrial life of America". Racially and geographically that is a natural process, though Washington has an extraordinary way of dissembling its affections. Mr Beck speaks with authority, for he has been officially identified with the Asbestos Industry in Quebec. The trouble is, Washington would have the finished articles, while Canada cannot get along with "seconds".

The Engineer Mine

By a combination of tragedies and grim reapings, the Engineer Mine has reverted to the Alexander estate. Litigation may not be at an end, but title is clearer and it is possible the property before long will be worked. The lamentable death of Charlie Watson, the members of the Alexander family, and others, on the Princess Sophie, as a deal for the property was about to be closed, and a contest between claimants, has kept the Engineer Mine on the waiting list.

International Nickel Coming Back

It was taken for granted that the doings of the International Nickel Company for the year ended March 31,

would not evoke more than the thought that the industry has been through its worst, is passing toward convalescence, and gradually will resume normal activity. Letting the balance sheet tell it in figures, President Stanley makes what may be regarded as his inaugural address, in optimistic vein. "The company's business", he says, "during the first three months of 1922 indicates general improvement in the nickel industry. Monthly sales increased and inquiries for various products became more numerous. Foreign business is slowly becoming stabilized and further improvement is quite evident. Stocks of finished metal have been liquidated to such an extent that the Port Colborne refinery was started on May 1 and the mine and smelter at Copper Cliff will be started not later than September 1, 1922".

Meanwhile, the refinery will work off what was bequeathed to it from the abandoned refinery at Bayonne, and what nickel there is in hand. Market conditions are not such as to warrant operations in the mining and smelting departments. Revival in the steel trade in the United States having hastened the liquidation of whait nickel was being carried, Mr. Stanley from personal knowledge is enabled to forecast better days.

Otherwise the 1921-22 report shows a net loss of $1,335,581 after charges, taxes, depreciation and inventory adjustment against a net income of $2,029,700 or after payment of preferred dividends to 89 cents a share earned on the $41,834,600 outstanding common stock ($25 par) in the preceding year. After payment of preferred dividends the deficit was increased to $1,870,337 in contrast to a net income of $1,494,944.

The company's consolidated balance sheet shows a decrease of $741,652 in cash to $756,774, a drop of $1,001,000 in loans to $9,340,599. Accounts and bills receivable inventories to $9,340,599. Accounts and bills receivable increased $249,616 to $761,151. Accounts payable were reduced $9,890 to $494,846. The company's surplus was $10,015,840 against $11,886,177.

Mr. Melkman's "Chance of a Life Time".

Personalities other than complimentary are distasteful and should have little space in a technical journal. That is why no reference would have been made to an anonymous advertisement asking $25,000 for a third interest in a "gold mine upon which $75,000 has been expended," were it not that the "Chance of a Life Time" is still an off chance. If the infirmities of mortals and mines were less numerous, occasional lapses might be ignored. Mr. Saul Melkman (admittedly the author of the advertisement) has a prospect with some gold showings, to which he devoted attention. It is not a "mine", notwithstanding expensive propaganda and assiduous efforts elsewhere than at the property to make it appear to be "another Hollinger". Columns were written about it, both in Canada and London, principals went oversea with it; an outstanding Engineer came over to have a look at it and other things of merit presented by Mr. Melkman; but the "Chance of a Life Time" was rejected. Technically the Engineer may not have condemned it. His comment to the writer was: "There is not a ton of ore blocked out". At any rate Mr. Melkman insists he has a "mine". The proper thing for him to do is to be frank. Subtlety in such matters is unnecessary. When it was suggested to the London Engineer that this "mine" be entertained on an exploration basis and drilled, his reply was: "Considering the location, it is for the owners to do that before making estimates and before we could accept terms involving large outlay". So there are hopes—and fears— to be considered in estimating the value of Mr. Melkman's "mine".

NORTHERN MANITOBA MINING FIELD

BY REECE H. HAGUE

Mr Noah Timmins, of the Hollinger Consolidated Gold Mines Ltd., is expected to arrive in Northern Manitoba within the next few days, and his report on the Elbow Lake property is eagerly awaited by mining men in the district. Operations are continuing on the Murray and several other properties in the Elbow Lake area, and mining engineers who have returned to The Pas after visiting the new gold-fields report that things are going along very satisfactorily.

There has been a considerable influx of mining engineers into the Northern Manitoba mineral belt recently, new arrivals including Dr. R. C. Wallace, of the Manitoba University; Dr. W. F. Ferrier, of Toronto; A. L. Winckler and S. Ricker, representing the Canadian Mining Corporation; P. L. Foster, of New York, representing Exploration Company Ltd., of London, England; A. J. Bone, New York, representing large copper interests; D. J. Kennedy; I. D. D. Daimpre; Harry Darling; and Major Julius Cohen, Montreal, representing the Elbow Lake Mines Ltd.

Diamond drilling is in progress on a large sulphide body at Copper Lake on claims owned by J. P. Gordon and under option to the Nipissing group. Engineers Heidenreich and Wright are in charge of operations for the Nipissing interests, and while no official statement has been issued, it is understood that after drilling through 130 feet of solid sulphides, quartz veins running parallel to the sulphide body were encountered and followed to a considerable depth.

While very rich ore has been found on the Murray claims, and systematic assaying has been done, the results of the assay runs have not been made public.

Work by the Exploration Company on the Hanna claims has disclosed a very promising ore-body, and a party of Exploration Company men are at present at work on the Webb high-grade vein at the north end of Elbow Lake.

Several new and seemingly important gold finds have been reported from Elbow, Island, Claw, Barb, File and Reed Lakes in the western portion of the mineral belt; while copper discoverigs are reported from theAthapapuskow and Schist lake section.

Shaft sinking on the Hobson-Smith property at Neso Lake, a few miles from Lake Athapapuskow, has resulted in a large and promising ore body being disclosed with values of around 15 per cent copper, $3 in gold and a trace of silver.

The latest find from Herb Lake is only ten miles from Mile 94 on the Hudson Bay Railway and is some eight miles from the Rex property. This extends the area in Herb Lake over which gold-bearing quartz has been found. Samples from the new find have a high gold content and the vein is said to be well defined and some five feet in width. Several properties at Herb Lake are now under examination by mining engineers.

Every boat leaving for the mineral belt is packed to capacity and the travel routes from The Pas are busy continuously. Barge-loads of supplies are being taken in to the various camps and new prospectors and mining men are arriving in The Pas on every train.

News of Mining

United States

In the southern districts of Fayette County, Pennsylvania, the homes of many coal miners who have refused to join the union stikers have been dynamited. Hitherto no lives have been lost, but the families of the non-union miners are terrorized. A preliminary to these outrages was the theft of about 6,000 sticks of dynamite from the magazine of the Deyarmon Coal Company.

During the eighth week of the coal strike the production of bituminous coal was 5,000,000 tons, according to the estimate of the United States Geological survey. The output of the previous week May 13-20, was 4,472,000 tons. This is nearly 5,000,000 tons short of the 1921 weekly output. Estimates made unofficially indicate that approximately 514,500 miners are on strike and that about 121,000 are at work. The strikers include 117,000 non-union workers.

John Munro Longyear, a prominent mining engineer operator, and capitalist, died at his home in Brookline, Mass., on May 28th. Mr. Longyear had large holdings of Michigan mineral and timberland. He was actively interested in the Michigan College of Mines for many years and was a member of the corporation of the Massachusetts Institute of Technology.

There was a very marked decrease in the output of aluminium in 1921 in the United States. While the value of the output for 1920 was $41,375,000, that for the year 1921 was only $10,906,000. Throughout the year the imported metal was selling at two to three cents less per pound than domestic aluminium of the same grade. The price per pound dropped from 28 cents in January to 20 cents in December. Both imports and exports were less in volume than in 1920.

The Anaconda Mining Company, Butte, Montana, has carried out a series of trials of the new Hawkesworth drill point. The point weighs less than four ounces, is made of vanadium steel, and fits into the shank with a groove. It is easily detachable. Its use obviates the necessity of hoisting and lowering the large supply of drill steel required for each shift. A drillman can carry in his hand sufficient points for his shift's work.

The ore reserves of the Miami Copper Company, as in January 18th, 1922, were estimated at 36,000,000 tons of 1.6 per cent. copper ore; 6,000,000 tons of 2 per cent. ore, and 8,900,000 tons of 2.26 per cent. ore. The sum of $1,191,228 was paid in dividends during the year 1921, and net profits amounted to $929,981.35.

The Yukon gold company reports a defiet of $316,875.31. for the year 1921.

Great Britain

Messrs. S. Pearson and Sons, drilling for the government, are reported to have struck oil at a depth of 1,810 feet at D'Arcy, near Edinburgh. This substantiates the belief in the existence of oil beneath the Lothian shales.

Figures published by the statistical department of the London Metal Exchange show the total amount of copper in stock at the end of April as 11,183 tons. This is less by 1685 tons than the quantity in stock at the end of March. Australia and Burma are at present supplying the London market with lead, only very small quantities coming from the United States.

The city of Middlesborough, England, utilizes coke oven gas for domestic purposes. It is computed that thereby a saving of more than 380,000 tons of coal has been effected within a few years.

Europe

Earnest Solvay, inventor of the Solvay soda process, died in Brussels on the morning of May 26th. M. Solvay was 84 years of age. He was the son of a salt refiner. His first patents were taken out in 1861, when soda cost $55 per ton. After a long struggle success crowned his efforts. The outstanding result of his process was the reduction in the price of soda to $20 per ton. During the war he was imprisoned for three months by the Germans on account of his activities in Belgian relief work. Eight years ago King Albert appointed him a Grand Officer of the Order of Leopold and he was also the recipient of the Lavoisier Medal of the Institute of France and the Grand Medal of the University of Paris. His gifts to educational and charitable institutions were munificent.

Changes in the scale of wages and in the working conditions in the iron industry of Norway have been authorized by the Norwegian Industrial Arbitration Court. The chief item of change is a reduction of about 14 cents per hour in the pay of skilled workers.

Coal miners in the Borinage district, Belgium, have struck in protest against reductions in wages of 12 per cent. and of 7 per cent. in the wages of skilled and unskilled workers respectively.

A commercial union, in operation May 1st, now subsists between Belgium and Luxemburg. The trade of Luxemburg with Germany and France subject to Belgium is subject to no customs or restrictions whatever.

A Government Bill has been introduced in the German Reichstag to legalize the seven-hour shift in coal mines. A special clause reserves for the minister of labour the right to extend the shift by one-half hour when deemed necessary or expedient.

Africa

Asbestos mining is assuming considerable proportions in southern Rhodesia, and is growing only less rapidly in South Africa. The Rhodesian output for 1921 was valued at £103,067. Practically all the Rhodesian production comes from the Shabani and the Mashaba districts. The De Beers group has a very strong hold here. Here, also, it is authoritatively stated, Canadian asbestos operators are investing. In the Union of South Africa, producers of crocidolite or "Cape blue" asbestos are establishing a good market in the United States. The industry as a whole is recovering from the sure slump of 1919-20 and is showing unprecedented activity.

The rapid growth of the manufacture of stainless steel has been directly reflected in the revival of chromite minings in Rhodesia. Rhodesia chromite is somewhat higher in chromic oxide and lower in ferrous oxide than Indian chromite. It is a physically hard ore that breaks in clean lumps. On the other hand, the new Caledonian chromite is friable and pulverulent, and of higher chromic oxide content than the Rhodesian ore.

The ore reserves of the States Mines Witwatersrand, South Africa, are now re-estimated at 10,232,000 tons, the stoping width of the veins being 77 inches and the average value per ton 8.5 dwt. The amount of ore milled in 1921 was 1,625,500 tons of an average value of 34s 9d. per ton. The costs per ton are 24s 7 6d. The working profit was £1,070,309. Near the centre of one property

a circular shaft 22 feet in diameter, is being sunk to a depth of 3,500 feet for ventilating purposes. The estimated cost is £125,000.

The ore reserves of the Randfontein Central Mine, South Africa, as on January 1st 1922, were estimated at 4,142,100 tons carrying an average of 6.2 dwt. gold over a stoping width of 49 inches. All ore of a value of 5 dwt. per ton and over is included in this estimate. About one and one-half million tons of ore are milled annually. A 300-drill steam turbo-compressor is being installed this year.

The daily wages of white workmen on the Rand have risen since the year 1913, 55 per cent; native wages, 18 per cent. The cost of stores has risen in the same period 43 per cent.

Australia

The Zinc Producers' Association, Limited, Australia, under its agreement with the British Government, has disposed to date of 836,000 tons of concentrates and 5000 tons of spelter, and small quantities have been used by the government.

The oldest iron and steel enterprise in Australia is the Hoskins Iron and Steel Company Limited, Lithgow, New South Wales. It is capitalized at £2,500,000, and is controlled by the Hoskins family. The principal plant is situated at Lithgow in the Blue Mountains, 100 miles west of Sydney. The Company owns large holdings of iron ore lands in New South Wales and Tasmania and operates collieries and coke-ovens 50 miles south of Sydney. At the Lithgow plant the coal supply is mined only a quarter of a mile away. The Company's ore reserves are stated to contain between 80,000,000 tons and 100,000,000 tons. The coke-oven plant at Lithgow consists of 95 Belgian type ovens with a capacity of 1,500 tons of coke per week. The capacity of the two blast-furnaces is 150,000 tons of iron per annum.

Asia

During the week ending May 27th India bought £800,000 gold. It was bought in the London market at one shilling above United States parity and was shipped on the P. and O. liner "Egypt".

In the province of Heilungkiang, China, seven gold mines are stated to be operating, one of the richest of these mines was worked by Russians for some time without the knowledge of the Chinese authorities. It and two others are now under Government control.

Book Reviews

CANADIAN MINING HANDBOOK—by W. A. Morgan. Published by Walter R. Skinner, 15 Dorogate Hill Cannon Street, London,E. C. 4.—Price 1s. 9d. post free.

A cautionary introduction, in which the investing public is warned to watch its step, opens this booklet. As further introduction, parts of an address by Mr. T. W. Gibson, Deputy Minister of Mines, Ontario, occupy seven pages. Mr. Gibson needs no commendation from us. His matter is ever pithy and exact. For the rest, there are more than fifty pages constituting a directory of Canadian mines.

In the main, this will be found exceedingly handy, and will assuredly serve to advertize Canadian mining. One feature grates somewhat on our feelings, although it would be totally unfair to blame the compiler in any way whatever. The Associated Goldfields Mining Company, Limited, is listed on one of the early pages. Against a capitalization of $30,000,000, its mining properties are given a book-value of $20,985,398. This, of course, is an arrant absurdity. It would be much nearer the truth to cut off the five figures to the right of the dollar sign and let it go at that. Another old friend crops up on page 44, the Porcupine-Davidson Gold Mines, Limited. We must confess that the Davidson is not in the same class as the Associated Gold fields. It, the Davidson, has something to show in the way of ore. Also it has a very decorative directorate. But its finances have been juggled so wonderfully and fearfully that only an expert accountant could tell a shareholder where he stands. Neither concern is a credit to Canadian gold mining.

However, this digression is quite unjust to the Handbook, which we welcome sincerely and commend to our readers. In time it may become the sister volume to Mr. Skinner's "Mining Manual"; but it will have a long route to travel to achieve that enviable distinction.

MINING HAND BOOK OF CANADA, 1922.—compiled by R. E. Hore and J. J. Kingsmill.—The Investors' Mining Hand Book Co., 56 King St. West, Toronto. Pp. 128; Price, paper covers, $1.00; leather, $2.00—

There has just been published a convenient little hand book of Canadian mining and mining companies. It contains, at the beginning, 36 pages of information about the occurence and production of the various minerals in Canada, and the dividends paid by gold and silver mines in Ontario. Then follow 80 pages giving details as to the various incorporated mining companies of the Dominion. The insertion of several small maps elucidates the text.

This little book does not pretend to be a "guide". It is a convenient source of information. It places Canadian Associated Goldfields (of Larder Lake) and Canadian Collieries (Dunsmuir) Ltd., side by side, and leaves it to the readers to discriminate between the going concern and the illicit promotion. The Hollinger Consolidated Gold Mines, Ltd., and the Holtyrex Gold Mines Ltd., are differentiated, for the discerning, by the note that the latter "is diamond drilling". The hand book will be useful to many interested in the mining industry.

NORTHERN ONTARIO PROPERTIES

Northcrown

The Northcrown Porcupine Mines Ltd. recently resumed exploration work at the Porcupine Crown property. Northcrown was formed to operate Porcupine Crown and Thompson Krist properties. Work was discontinued in 1921 owing to lack of funds. Controlling interest in Northcrown is owned by Porcupine Crown Mines and the latter company provided the money used in the work last year.

Night Hawk

Development at the properties operated by Night Hawk Peninsular Mines Ltd., at Night Hawk lake is reported to have given very satisfactory results. This company owns or has options on most of the shares of Porcupine Peninsular Gold Mines and is operating that company's property. Night Hawk also owns or controls several neighboring properties giving the company control of about 1500 acres. Mr. A. R. Globe is general manager. The drift at 180 ft. opened up a good ore body and work is now proceeding at the 300 ft. level.

Notes From Nova Scotia

Rebuilding 43 Miles of Airways

To reconstruct the airways of ten collieries is a big undertaking, costing large sums of money and it will take a long time to complete the work; but it must be done in order that the Empire Steel Company should be able to carry though the large program they have laid out for the development of the Cape Breton collieries. Forty-three miles of airways had to be rebuilt and placed in a permanent condition to last until such time as all undersea coal is taken from the farthest point.

The control of ventilation is under the Mine Engineering Department with Alex. L. Hay in charge. The work has been standardized wherever it is possible to adopt uniform methods of construction. In the main airways, 1,200 concrete stoppings had to be built. Half of these are finished and the other half are in process of construction. This is equivalent to 4,000 cubic feet of concrete. The mixture used is 1, 2 and 4. Slag from Sydney Steel Works was used in place of gravel with success. Steel supports for the roof have been largely used. These are simply old heavy rails discarded by the railways.

Ventilating System

The ascensional system of ventilation is being established. Fresh air enters the mine by way of double intakes and is carried direct to the working faces, where it is distributed and finds its way back up to the surface again.

The mines are divided into ventilating panels or sections for the purpose of having all haulage-ways neutral. Going hand in hand with the ventilation scheme, efforts are being made to control the dust situation by establishing wet zones at the entry of all panels. In working places sprays are used, but in abandoned workings dams are built. These are from 2 to 4 feet high and create wet zones over a distance of 200 or 100 feet according to the grade of the level.

While all this re building is going on, the air courses have been made as tight as possible to prevent leakage and the results have been surprising.

An analysis of air is made at intervals. All Mine Managers are advised of the condition of the mine atmosphere. The introduction of this practice has been found to be most beneficial to the mine manager interested in the safety of his colliery.

In the secondary airways the stoppings formerly built were of double boards with brattice cloth between them. These were found to be inefficient and much leakage occurred. Stoppings built today are of boards with double battens across the joints and the whole is given a facing of hardwall plaster and sand in proportion of one and one, and in less important places of one and two. As the overburden increases, it may be found necessary to built all stoppings of solid wooden blocks laid either in cement or plaster.

The expenditure on air-course construction has been great, but there can be little doubt that when the work is completed the gain made by saving in power will be large, and will, while adding much to the safety of the mine and the health of the miner, reimburse the Company in course of time.

Electric Power in Mines

Compressed air is the power now used to operate mining machines and all the small donkey haulage engines underground. Over long distances the efficiency of this power is greatly reduced, and the upkeep of air lines is heavy. The time has been reached when electricity must be used and air power gradually discarded.

For this purpose the collieries are being electrified. To the two large power plants now in operation, a third is to be added. This will be of 60 cycle frequency and can be linked up with the Sydney Steel and Sydney Mines systems.

In preparation for this change the ventilation of all the large collieries is being reconstructed. Fresh air will be led direct to all working faces and electric mining machines will be installed. The Nova Scotia Government in 1908, foreseeing the time when the working of the undersea areas would become a great economic problem, appointed an Electric Commission, who gathered evidence in Nova Scotia and at the collieries of the United States. The report of the Commission headed by Judge Patterson caused the Government to draw up and approve rules and regulations governing the use of electricity in coal mines. Under these rules, electrically driven pumps and electric mining machines have been operated for years. The general application of electric power can only come about gradually, there being many valuable air compressors and much air driven machinery in use at the present time.

Training in First-aid

Following out the original plans of instructing their workmen in first-aid to the injured with the purpose of having a large number of trained men all over the works and in the collieries of the Empire Steel Company, the Safety Department has completed the work of organizing classes.

In the mining districts of the United States and most other coal producing countries, miners have entered upon this work with much enthusiasm, and the attendance and interest has been most surprising. Competitions in first-aid are features in many of the mining towns, and the operators, the labour unions and the Government bear a third each of the expense incurred at these trials of skill. We in Nova Scotia have not reached that fortunate stage of hearty co-operation, but we are not without hope of something attaining it.

Over five years ago the Mines Department of the Halifax Government called a meeting in Halifax of representatives of employees and employers to discuss safety work. It was a very enthusiastic meeting, and while it accomplished the purpose for which it had been called, yet the Government has not seen fit to become a contributing factor to work of this kind at the collieries they supervise. The matter has been left entirely to the Coal Companies to carry on in their own way. In order to arouse more interest in this work, it is the intention of the Empire Steel Company to hold a competition during the summer. Teams from Sydney, Sydney Mines and other colliery districts will take part.

The First Aid Classes under the Safety Department of the Empire Steel Corporation were a little late this year in getting together. This was largely due to unsettled conditions at the collieries, the inactivity at the steel works, the hard winter weather and the prevalence of flu which kept all the doctors busy.

Last year sixteen classes with a roll membership of 180 succeeded in qualifying 261 students, 21 of whom passed their examinations and received certificates.

The number of classes this year is sixteen. Thirteen of these are at the collieries, one at Sydney, one at the general shop, and one at the railway and auxiliary department. The total enrollment is 300, a good number, everything considered.

Details of the Course

The course consists of six lectures given in six consecutive weeks. The classes are taught by the colliery doctors. A student to qualify for examination must be able to show that he has attended at least five lectures. Records of attendance are kept at the collieries and forwarded to the Safety Office, Glace Bay. When the classes show a falling off in attendance the Safety Office gets busy and a truancy man is sent out to hunt up non-attenders. In all cases this method has brought the class up to normal.

The text book of the St. John's Ambulance Association is used. The lecture lasts about one hour, after which a practical demonstration is given by a first-aid expert. Thus theory and practice go hand in hand. Second year students qualify for the Voucher Diploma of the Association. The Medallion is granted to third-year classes and a Bar for each one of four years study afterwards. Eight first-aid stations have been established at the collieries and one at the central machine shop.

All buildings are conveniently placed at the collieries and on the works. They are finished inside with white enamel, are kept spotlessly clean and are comfortably heated. Besides hot and cold water, they are supplied with all necessary medicines, bandages, splints, etc. Each station has a hospital cot. At the No. 6 and Birch Grove collieries, operating tables are installed for emergency cases, as these places are at a considerable distance from the larger hospitals.

Eight ambulances serve these stations, besides doing the work of carrying sick workingmen and their families to and from the hospitals. These ambulances have been lately fitted up with rubber tires and electric lights within and without for night travel. An improved stretcher carriage to further lessen the jolts in transportation is about to be adopted.

First aid has been extended to meet underground conditions and stretchers with all necessary supplies are kept at central places underground. The American Army type of stretcher is used, and with other necessary equipment is kept enclosed in a metal cylinder.

With years of continuous instruction a large number of workmen should become efficient in rendering first aid to their fellow-workmen when necessary. No situation can arise where trained men cannot be of great benefit to the injured.

When war broke out and Britain, France and Belgium needed stretcher-bearers faster than they could train them, the colliery and large manufacturing districts provided a small army of men who had been taught how to aid the injured. We are not instructing for war, but in the course of industrial life, the services of such men are most valuable and much needed.

Big Coal Seams Continue under Lingan Bay

It will no doubt be interesting to the non-mining as well as to the mining population of the Cape Breton Colliery Districts to learn that both the Phalen and the Harbour seams are found in the New Waterford and Sydney Mines districts. There are changes, however, in the height of the seam and in the nature of the overlying strata, and also of the angle of dip, but nevertheless the Phalen seam is worked at New Waterford and the Harbour seam runs on to Sydney Mines. The general belief has heretofore been that the collieries of New Waterford and Sydney Mines were on seams known only to that district.

Besides Nos. 1, 2, 4, 5 and 6, collieries, Nos. 15 and 16 collieries, New Waterford are working on the Phalen seam. The old Lingan mine was also working on the Phalen.

No. 9 Harbour seam is tapped in New Waterford by collieries Nos. 12, 14 and 17, and at Sydney Mines by Princess and Florence collieries.

To those of us who had the pleasure in days gone by of knowing Mines Inspector, Patrick Neville, it was most interesting to sit and listen to his theories of the Phalen seam under Lingan Bay. Mr. Neville was a natural prospector, and had a most wonderful knowledge of the Cape Breton coal fields. He held that there was an anticline about the centre of Lingan Bay which affected the Phalen seam, but that it would be found as the seam ran to the dip that this anticline would end and the coal would be found running far off to the north in regular formation. This was just what was found. For a time it appeared that the north side of No. 1 colliery had struck the northern outcrop, and the levels were much shortened. But as greater depths were reached it was discovered that the supposed outcrop was an anticline, which had affected the rise workings but disappeared entirely on the dip. As the seam now is, it can be traced direct from either No. 1 or No. 2 collieries under the bed of the Lingan Bay and the proposed new colliery of No. 26 may yet drive right on into the workings of Nos. 15 and 16, New Waterford. No. 9 colliery, operating from the same shaft as No. 2, may also find its way into the workings of 12 and 14, as it lies directly over the Phalen seam. But it keeps on, crossing under Sydney Harbour, and the output of Sydney Mines collieries is largely drawn from this same seam, (the Harbour). How far these two seams continue under the ocean is a problem which the future only will reveal.

The Quality of Sydney Coal

There is another feature common to both of these seams and that is the change in quality of the coal as it is found in the east or the west. In no place is the quality poor, but both seams are found at their best the further they run to the north-west. The old Sydney Mines coal, famous for many years, sold at a higher price than other Cape Breton coal, although it has now been fully demonstrated that it is just the Harbour seam of Glace Bay. The coal of Nos. 12 and 14 collieries is excellent in quality. Reserve Mines coal was a good seller, but superior as the quality was, it is surpassed to-day by the product from Nos. 15 and 16 collieries.

The rock roof in the Waterford district, especially to the rise, is heavy and hard to hold up; but towards the dip the stratum becomes firmer and is not so difficult to support. In the New Waterford district the angle of dip is slightly heavier, but it has been found that it eases off in the lower workings, and it is believed that greater depths will find a uniform and easy pitch over the entire coalfield.

The mainways of Nos. 1 and 9 collieries are being built to stand for many years, and the time may not be far distant when we may be able to enter a mine on the southern side of the Island and pass underneath the waters of Lingan and Sydney Harbour emerging on the other side by way of Princess or Florence Collieries.

Berlin capitalists are planning the development of coal deposits and the establishment of briquetting plants in the Dragoman Region, Bulgaria.

Northern Ontario Letter

The outstanding features of the mining industry of Northern Ontario during the first quarter of the current year, are the facts that the production of gold was more than doubled as compared with the first quarter of 1921, while the output of silver also increased to an important degree.

In turning out $4,675,475 during the first three months of 1922 (according to official figures), the gold mines of Northern Ontario easily established the highest record so far in their history, this being an increase of $2,378,953 over the output for the first three months of last year. This production is at the rate of $18,701,900 a year. Add to this the fact that the enlarged McIntyre-Porcupine mill will go into operation next week and that the Teck-Hughes will increase its output, as well as other increases at other mines, and it is evident that the aggregate yield for the whole of 1922 will exceed $20,000,000.

Power Development Still Delayed

The question of allotting rights to develop power on the Abitibi River is still unsettled, according to advice received officially by the representative of the Journal from Premier E. C. Drury, who says, in answer to the direct question:

"I am unable to give you the information you desire, as this matter is still under consideration."

Therefore, although about 300,000 h.p. is running to waste and in spite of there being interests in Northern Ontario who have the money and the inclination to develop the power, the entire proposition is held in abeyance indefinitely.

In view of the momentum which industry would gather from the present wave of enthusiasm throughout the north where natural resources are being developed, it is considered little short of a calamity that such lethargy (or something worse) should be made so manifest at the capital city of Ontario.

"This is not progress!" is the somewhat disparaging remark made this week to your correspondent by a prominent Northern Ontario citizen when shown the evidence of uncertainty in connection with power development on the Abitibi.

High-Grade Vein on Lake Shore

Developments of importance continue at the Lake Shore mine, particularly at the 600-ft. level. The drift at this depth has attained a length of approximately 2,000 feet on vein No. 2 and upward of four-fifths of the total length is in good ore.

So rich is the ore and so consistent the mineralization, that it is now possible to classify this vein as the most valuable individual gold ore deposit so far developed in Canada. Not only this, but in addition to the millions known to lie in the deposit as found within the boundaries of the Lake Shore, this is the same vein that continues to the west across the adjoining Teck-Hughes and the Kirkland Lake, as well as to the east across the Wright-Hargreaves, Sylvanite and into the Kirkland Lake Proprietary.

Dome Takes Option on Foley O'Brien

According to advice just received here, the old Foley O'Brien property has finally been optioned by the Dome Mines Company, the option being for eleven years. No details have been known as to the amount to be paid. It has been intimated, however, that the Foley O'Brien is to be paid for with Dome treasury shares.

In connection with the question of further capital returns on Dome shares, the follwing unofficial comment comes from New York:—

"There is reported to be no prospect of increasing the Dome dividend rate this June, but another large capital return is scheduled to be announced around the end of the calendar year for distribution about the end of the fiscal year, March 31st, next."

Coniagas in Kowkash District

It has been announced that the Coniagas Company has secured a working option on a big group of claims in the Kowkash mining division and will carry on exploration work by use of a diamond drill.

The property involved is known as the Hull-Kipper, and is known to have a big but low-grade ore deposit within its boundaries. Offers were formerly made by Cobalt companies to explore the property with diamond drills, but the original owners were opposed to this method of exploration. The deaths of both Nelson Hull and his partner, Kipper, the original owners, have been followed by the granting of the option to the Coniagas.

Values of from $3.50 to over $4 a ton have been mentioned as having been obtained from channel samples taken over exceptionally great width on the property. This fact, together with the property lying in comparatively new territory to the east and north of Lake Nipigon tends to attract widespread interest.

Teck-Hughes

During the month of May the Teck Hughes mill treated 4,840 tons of ore, showing an average daily capacity of upwards of 156 tons, and comprising the largest tonnage ever treated in any one month so far in the history of the mine.

The ore continued to come from the upper levels, with the exception of a small tonnage from the new vein found at the 730-ft. level on which drifting is being done. Consequently, heads of around $10 a ton were maintained, and would indicate a production of between $40,000 and $50,000 for the month.

Owing to delay in connection with delivery, the new hoist which is to be installed at the 500 ft. level will not be in use until during the third week in June. However, the installation of this machine will signalize a commencement of drawing ore from the 605 and 730 ft. levels and will mark an early increase in the value of the mill feed and the monthly production.

About 200 feet of lateral work has been done at a depth of 730 feet, including drifts in both directions on the new vein as well as a cross-cut to the main deposit. The cross-cut has reached the main vein at the 730 ft. level and the work of the next few weeks at this point promises to be interesting. Meanwhile, drifting on the new vein has shown the deposit to be important, the width in the east face being between six and seven feet and the average gold content, very satisfactory.

The Teck Hughes is employing a force of about 95 men, including surface crew and office staff. The large tonnage being handled by such a force is pointed to as indicating a high degree of efficiency.

Kirkland Lake Proprietary Mill in Operation

After having been non-productive for a number of years, and in complete idleness for a large part of that

time the Tough-Oakes mine of the Kirkland Lake Proprietary has once more commenced to turn out gold bricks, the first clean-up in the mill having been made a few days ago.

It was nearing the close of last year when Mr. Thomas, manager of the mine, got work under way at the Kirkland Lake Proprietary (Tough-Oakes and Burnside), and the fact that the transformation from a run-down property to a gold producer has been accomplished in so short a time is a matter that merits favorable comment.

The main "break" at the 100 ft. level has been the chief source of ore for the time being, the present work being preliminary to getting the enterprise on a normal basis at such time as the development program can be completed. As to this, the cross-cut north to vein No. 11 has been completed and already the drift on this vein is in about 65 feet and will soon reach the point from where ore will be drawn. Also, the cross-cut from the bottom of the shaft at a depth of 550 feet is at a point where the downward continuation of the main deposit as found at the 400-ft. level is expected to be encountered with each round of holes.

Hollinger Reserve to Resume Development Work

Arrangements are stated to be under way to re-open the Hollinger Reserve property within the next three weeks. The property was originally worked by Benny Hollinger, the prospector who staked out the Hollinger Gold Mines. Development work was carried to a depth of 300 feet and some very good ore was opened up. After the death of Mr. Hollinger, the property passed to Barney McEnmany and until last year remained the property of the McEnmany Estate following the death of the owner.

Late in 1921 a deal was closed whereby a Toronto syndicate secured the property, and it has been intimated that A. E. Osler of Toronto is identified with the new enterprise.

Shaft of Kirkland Lake Still Sinking

The work of continuing the main shaft of the Kirkland Lake Mining Company to deeper levels is now under way. The present deepest workings are at 900 ft. and it is planned to open up another development level at 1,050 and until another at 1,150 feet. At the time of visiting the mine, the representative of the Journal found the miners at work at a depth of 940 feet, this being the deepest point so far attained in the Kirkland Lake field.

The result of development work at the 900-ft. level has been favorable, and a very good shoot of ore has been opened up in a drift to the west. Milling is still restricted to less than full capacity for the reason that development work is not yet sufficiently advanced to utilize the full equipment. However, production is paying for all development work and is leaving a fair margin of profit. Should the result of work at the two deeper levels, prove the occurrence of ore of equal richness to that found at the 900-ft. level, no difficulty of 150 to 160 tons daily and realizing good profits. A total force of about 90 men are employed, including the crew engaged in shaft-sinking.

King-Kirkland

Contracts have been let to sink the shaft to a depth of 300 feet on the King-Kirkland Gold Mines. During the course of previous exploration and development work, a shaft was driven to a depth of 100 feet, at which point some drifting was done in good ore. This encouraged the company to install a modern mining plant and arrange plans for extensive operations. The plant is now in readiness for work, and the enterprise will take a place among the more promising of the active gold properties in the development stage.

This information has been secured in official circles and, coming almost concurrent with advice that the Bidgood has commenced to sink from 400 to 600 feet in depth, tends to show the importance to which mining has attained in this part of the Kirkland Lake district.

Hayden-Porcupine

Work is proceeding steadily on the property of the Hayden-Porcupine, and there are prospects of this being a busy summer in that section of the Porcupine gold area, where there are situated the Hollinger Reserve and Porcupine Mutual Gold Mines Syndicate in addition to the Hayden.

Kenogami Lake

Some very good ore has been found on property situated in Eby township on the west side of South Bay, Kenogami Lake. In addition to mineralization of importance being visible, the assay sheet shows favorable average values.

Georgg Andrews of New Liskeard and Jack Leat are among those interested in the property.

On a visit to Swastika, the representative of the Journal learned that there are perhaps more prospectors engaged in exploration work in Eby township than at any previous time with the exception of the first rush some years ago to that section.

One Diamond-Drill on Porcupine-Davidson

Operations on the Porcupine-Davidson property still consists of one diamond drilling machine. It has not yet been announced what course will be pursued in the light of only about 25 p.c. of the recent stock offer having been taken up in England.

Many Prospectors in Northern Ontario

Mr. Percy Hopkins, geologist for the Ontario Department of Mines, who is making a survey of the eastern part of the Kirkland Lake district, covering Lebel and Ganthier townships and extending to around Pancake Lake in the Larder Lake district, made the statement to this paper that there are more prospectors working throughout Northern Ontario than ever before in the history of the Province. Mr. Hopkins expressed the belief that some important discoveries might reasonably be expected to be made as a consequence of the widespread search now being conducted.

Coniagas Active in Pioneer Work

The Coniagas is stated to have employed a diamond drilling machine with which to explore a group of claims situated in Holmes township, lying to the north-east of Fort Matachewan.

The Coniagas is proving itself to be an excellent pioneer company. In addition to maintaining heavy production from its Cobalt property, the company is exploring the old Ruby property in Bucke township, the Hull-Kipper property at Tashota, the Newray property in Porcupine and a group of claims in Holmes township.

Road to Oxford-Cobalt

In the report by Mr. Cyril Knight, for the Ontario Department of Mines, reference is made to south-east Coleman meriting discriminating attention. For this and other reasons, the Ontario Government has sanctioned the building of a short road to connect the Oxford-Cobalt property at Kerr Lake, and has made appropriations for this work.

As soon as the details about the road have been completed, the Oxford-Cobalt will resume work, according to J. W. Russell, manager. The first work will consist of driving a drift for the purpose of intersecting the junction of a strong north and south vein running into deeper Keewatin formation.

EDITORIAL

Scientific prospecting is not yet really begun. I know of no field of greater promise for the applied scientist than that of scientific prospecting. C. I. Corless, 1922.

AIDING PROSPECTORS IN QUEBEC

A well-known Canadian geologist has written, for this issue of the *Canadian Mining Journal*, a resumé of the conditions under which gold is now known to occur in Northern Ontario and Quebec. His conclusions are based upon a study of all the known facts, correlated in a broad way such as precludes the chance of serious error. His opinion is the consensus of opinion of a number of well qualified students of the subject. Their knowledge of the subject is, necessarily, not complete; but the conclusions recorded here are safely within the bounds of observed facts.

These deductions from geological observation are now to be put to the test in a practical way. It will be a comparatively simple matter for Dr. Cooke's trained geologists to gather the data for a map that will be of incalculable benefit to prospectors. With the aid of this map, the work of trained prospectors will be fully effective, and that of men less skilled in their calling will be facilitated to an extent that an outsider can hardly realize. If there is gold to be found in the region to be mapped by Dr. Cooke, to the Geological Survey will accrue the credit of having adopted the most logical means of finding it.

But there are important factors in the development of mineral bearing lands other than the mere finding of promising outcrops of ore. Chief among these is the law under which mineral deposits found by prospectors can be acquired by them.

From ten to fifteen years ago, that part of the province of Ontario to the north of Lake Temiskaming and adjacent to the Quebec boundary was swarming with prospectors. This interprovincial boundary, a line almost or quite invisible, formed a barrier across which few of them ventured. Why was this? There were no terrors on the Quebec side, and the lure of gold and silver was just as strong to the east as to the west of this boundary. Yet any well informed prospector would smile in a superior way at the unsophisticated one who proposed a trip into Quebec.

It was, at that time, a well known fact that if a prospector found, say, a promising gold vein east of the boundary, he had little chance of retaining it unless he had the key of a back door entrance to the recording office in the city of Quebec. The provincial mining law of the time was faulty, and its administration was worse. Hence, North-ern Quebec was virtually a preserve, from which were excluded all prospectors except those with "influence" at Quebec City.

The situation is now radically different. The new mining law of the Province of Quebec is drawn up in a sound and logical way, and is more than usually favourable to prospectors. It is said that the maladministration characteristic of the old law has been superseded by a regime under which a prospector can openly claim and retain the rights to which the law entitles him. It is now, apparently, quite logical for a prospector to march through the front door of the recording office of the Province, confident that his just claims will be respected.

The full benefit of Dr. Cooke's present exploratory work in Northern Quebec will be gained only if it is realized among the generality of prospectors that the conditions that artificially restricted prospecting in that province in former years no longer exist. The old idea will linger long unless active measures are taken to combat it.

BRITISH MONEY FOR BRITISH DOMINIONS

There has evidently been launched in London lately a well organized and decided movement in favour of the development of the natural resources of the Empire. The slogan "Britons for British Dominions" is to be accompanied by "British money for British Dominions." One cable dispatch quotes *The Times* as saying that, since the Soviet has decided to remain apart from the world, British capital must look to the Empire for its opportunities of investment. Another announcement is to the effect that a group of prominent British manufacturers will enter seriously into supplying the Canadian trade in competition with the United States, using Canada chiefly as their base of operations.

All this, and much more that has transpired recently, speaks well for future Anglo-Canadian solidarity. A large part of the British investment in Canada to date has been of the long distance variety, and consequently lacking in concentration and less satisfactory altogether than the investment it is now proposed to make.

It is true that there will not be the same opportunities for quick and easy wealth that there might be in say, Siberia. The British industrial pioneer in Siberia would have chances of development such as fall to the lot only of

those that penetrate far among untutored peoples. In Canada the British investor will have to meet the competition of native Canadians and of our southern neighbors. Still, this will not by any means deter those who have for centuries got more than their quota of gain from the free markets of the world.

The chief undeveloped resource of Canada is her mineral deposits. It is fortunate for Canada that this is so. To quote Dr. C. V. Corless in his presidential address of last March, "Mining is the basic industry of progress, as agriculture is of subsistence." Except for unfortunate (though unavoidable) mishaps in the food supply of some parts of the world, and the present unbalanced state of war-torn Central Europe, the subsistence of the human race is pretty well provided for, and so the possibilities of the development of agriculture in Canada by means of the export of food-stuffs is limited.

Mineral production is in quite a different case. The consumption of the products of the world's mines has, through successive ages, measured roughly the attendant degree of civilization. Creature comfort and the leisure that is the pre-requisite of mental development are almost entirely dependent upon the products of mines and quarries. We are as yet far from the end of the advancement of our material civilization, and hence our consumption of mineral products will continue to increase vastly.

It is most desirable that the capital necessary to develop Canada's mineral industry should come, as much as possible, from Britain. In this connection it is interesting to note, in the London *Financier,* a series of ten articles on "Ontario's Mineral Wealth," published during May. A special commissioner from this paper spent some time in the mining camps of Northern Ontario last summer, and the present series of descriptions is the result. They set out vividly, and very fairly, the conditions that exist in the northern mining district, and display the confidence in the future of the region that is characteristic of those concerned in its legitimate operations. There is, perhaps naturally and inevitably, a bias evident in favour of those properties in which Londoners are already interested, which upsets somewhat the balance of what is otherwise a highly commendable estimate of Northern Ontario's mining camps. For instance, it is hardly credible that the South Lorrain district will rival the adjacent Cobalt district in its silver production. But this series in the *Financier* cannot but give the British investing public a rational estimate of the possibilities of shrewd investment in Canadian mineral resources.

Inter-imperial relations have, since the commencement of the Great War, made most decided steps forward in various spheres. We are already commencing to reap benefits from this intercourse. By all means let us aid and encourage by every means in our power the development of Canadian mineral resources by means of British capital.

MINING ORE AND MINING THE PUBLIC

A prominent Canadian daily newspaper re-printed, last week, an article from the *Magazine of Wall Street,* entitled "New Traps for Investors." The caption used in this case was "Exposure of Current Methods Employed by Stock Swindlers to Fleece Unwary Investors." The article is a good one, giving explicit information about the methods of fake mine promoters,—how they circumvent the law, how they attract the attention of certain sections of the public and then convince them, and how they then disappear with the public's hard-earned cash. This is an excellent effort, which the *Canadian Mining Journal* heartily commends. The more frequently such interesting exposés of current methods of legalized robbery are made in the public press, the sooner will the operations of these light-fingered gentry be suppressed. It is, after all, only the force of well-voiced and well-informed public opinion that is really effective in dealing with such a case.

Unfortunately there is another side to the case in point. Turning over the pages of the same newspaper, we notice advertisements, larges and small, of mining promotions, some of which we know to be of very doubtful character, while others exaggerate in an entirely unwarranted way (which should be illegal) the facts upon which their claims are based. Inference and suggestion that is merely silly to the trained mining man is used to convince the unknowing reader. Truth, inference and downright falsehood are intermingled in these advertisements in a way that makes the whole fabric hard to unravel. A study of the more pretentious of them shows that much thought and ingenuity has been expended in playing the cards of a hand that, as dealt, could win a jack-pot only on a bluff, but, reinforced by judicious additions from the promoter's sleeve, is sure to win a good slice of the public's money. There is no law to prohibit this sort of robbery, and the only protection the public has is its own good sense (which is very unevenly distributed) and such warnings as that to which we here draw attention.

Our two-faced contemporary is, we are afraid, doing nothing to further the cause of honest mining promotion—for such a thing as honest mining promotion actually does exist. Its exposure, at second hand, of the methods to which it consistently lends its own pages is calculated rather to blind the public than to educate and warn it. The man who reads the warning will surely be inclined to believe that here is a newspaper on whose discrimination he can depend. Yet if he acts upon this belief, his purse-strings are unloosed and he is undone—or "done."

Most of the illicit stock flotation that curses our mining industry is done by certain stock brokers, who approach the public by means of daily papers and through the Royal mails, and by warrant of publicly-granted charters. We cannot logically condemn separately one of these agents or accessories to the swindle without including, to some degree, the remainder. By means of judicious attention to and by each of these four agents the present unwholesome

condition can be improved. The annual waste of funds that might be available for mining development, but is actually transferred to the pockets of human leeches, is appalling. The problem is worth much more serious and more general attention than it has ever yet received.

MINERAL PRODUCTION IN QUEBEC DURING 1921

The annual report on *Mining Operations in the Province of Quebec* for 1921, just issued, is this year a very slender volume. It records a production from the asbestos mines and quarries which, though substantial, is much below that of preceding years. All other mineral industries of the province declined in production during the year 1921 with the exception of feldspar. The development of the newly-found deposits of the Buckingham district near Ottawa has provided an assurance that "Canadian 'spar" will continue for long to hold the unique position it now enjoys in the United States market.

It is rather disappointing to notice that so little progress has been recorded in the mineral development of the province containing the greater part of the pre-Cambrian "shield," whose potentialities are now so well recognized. That the administration of the Bureau of Mines are, however, confident of what the future will bring is demonstrated by the inclusion in the Report of a long extract from Dr. C. V. Corless' presidential address of last March, setting forth the possibilities of Canada's, and particularly of Quebec's, ultimate capacity for mineral production.

The operations of the Federal Lead and Zinc Company in the Gaspé peninsula are given only short notice. This development promises to be one of the most important in Canada. The operations of the Canada China Clay Company, sixty miles north of Montreal, are not mentioned at all, presumably on account of work there having been resumed so recently. This also is a prospect whose future production may constitute a notable share of Quebec's mineral production.

EDITORIAL NOTES

The session of Parliament about to be prorogued, if it has done little to help the progress of the mining industry has done nothing to hinder it, which can be counted a blessing. The abysmal ignorance of matters pertaining to Canada's second basic industry has been obvious, as usual, among our elected representations at Ottawa. A bright spot, full of promise for the future, is the reputation earned during the session by Hon. Charles Stewart. His associates and staff in the Department of Mines are confident that the neglect that has formerly marked the ministerial administration of their Department will not continue under the present régime.

Canada has now another, and an eminent, spokesman in Britain. Our recent Governor-General, the Duke of Devonshire, says publicly that Canada's resources must be developed by British labour and by British capital. This idea must be re-iterated and impressed by every possible means, until it is firmly implanted in the consciousness of both Canadians and Britons.

The close relation between the building of railways and the development of mineral deposits is, apparently, better realized in Africa than in Canada. It has long been the ambition of various railway builders to finish the last links of the Cape-to-Cairo chain. Its completion within the near future is again being considered, and the exploratory work now in hand is not for a route, for arable land or for forest products, but for — adequate mineral deposits.

A prominent feature in the news of last week was the good roads convention in Vancouver, in which Premier Drury of Ontario took a prominent part. In the reported proceedings of the meetings we have failed to find any adequate discussion of the question of long-enduring, hard-rock surfaces to the permanent road foundations upon which so many of Canada's millions are now being spent annually. It is apparently a fact that has not yet penetrated to the consciousness of our road-builders, that enough money is now being wasted annually on putting down shoddy, soft rock surfaces to pay the expenses of good roads conventions for the next generation.

THE EDITOR IN ERUPTION

Deep on the laden desk the proof
Lies waiting to be done;
More will be making 'neath this roof
Ere setting of the sun.
The shadow of the make-up man
Darkens my dingy wall;
I'll murder him whene'er I can,
If time permits at all.
The copy that I get is vile,
Confounded badly writ—
How should I love to burn the pile
And see the last leaf lit!
My correspondents seem to think
That I have naught to do
When I am fairly on the brink
Of going up the flue!

* * *

So let me straightway confess,
So far as I'm concerned,
My job means intimate duress
With mighty little earned
"With mighty little earned", said I
Nay, what I should have said
Or had it wrong, I know not why
Is "Mighty little paid!"

ANON

The Search for Gold

CO-OPERATION OF GEOLOGISTS WITH PROSPECTORS

(Written for the Canadian Mining Journal)

During the last ten years our knowledge of the gold deposits of northern Canada has increased considerably, and bit by bit we have been gathering information tending to solve the all important question, *why* the gold occurs *where* it does. It is obvious, of course, that until the answer to this question is known, prospecting for gold cannot be carried on intelligently, but that prospectors must waste the bulk of their time and money searching in places where they will find nothing. Once let it be proved that gold occurs only under certain definite conditions, and the field of prospecting will be so narrowed that the same expenditure of money and effort on the prospectors' part will be productive of much greater results.

Although our knowledge of gold deposists is still far from this goal, certain things have been definitely determined which help to narrow the field of prospecting quite notably. It has been found that all the known occurrences of gold ores in northeastern Ontario and northern Quebec belong in age to certain definite metallogenetic epochs, to use a term coined by Lindgren. The gold of the Havilah mine, near Sault Ste Marie, of the Crystal Mine on lake Wanapitei, that which has been found with the silver ores of Cobalt and in other occurrences of this type, has originated from the diabase intrusions of the Keweenawan period. The gold at Long Lake gold mine near Sudbury, and of other occurrences in the same vicinity appears, with less certainty, to have come from intrusions of late Precambrian (Killarney) granite. The great bulk of the gold produced in Ontario, however, is now known to come from the Keewatin and Timiskaming formations where these are invaded by granitic rocks of pre-Huronian age. This has removed from the gold prospecting field the huge areas of granite, and the smaller but still large areas of Cobalt series, in the Precambrian shield. A still more notable step was made when it was proved that the gold-bearing solutions which gave rise to these pre-Huronian gold ore-deposits have emanated from the granitic intrusives, and hence that the deposits are to be looked for in the Keewatin or Timiskaming formations near the contacts of the granite bodies. It is needless to point out that this determination again narrows the field of prospecting. Within the last few years a third idea has been gaining ground, though it is as yet no more than a theory: that the gold deposits occur around only the *small* granitic intrusions. These smaller bodies have a characteristic porphyritic texture, and it is well known to every prospector that "porphyry" is a favorable indication of good prospecting ground. However, there are many porphyries and few gold deposits, so that probably still other things, yet to be learned, have governed the formation of the deposits.

The area from which most of the facts regarding the origin of gold deposits have been gathered is the Matachewan-Kirkland Lake-Larder Lake belt in northern Ontario. As this belt extends eastward into Quebec for more than 100 miles, with very similar geological conditions, the question has often been raised whether gold deposits might not be expected there also. The Geological Survey of Casanda this summer proposes to investigate this question, and is sending Dr. H. C. Cooke to map a large area adjacent to the Ontario boundary, on a scale of one mile to one inch. All bodies of granitic intrusives, particularly the smaller ones, are to be carefully delineated. Areas in which bed-rock is hidden by swamp, sand or other surface accummulations, and which from the propector's standpoint may be called negative areas, will also be shown. The resultant map will afford prospectors going into the area something definite to work on; they will be able to confine their efforts largely to the vicinity of intrusive masses of granite, and thus, if gold deposits exist there, they should be readily located.

Dr. Cooke, it may be added, has been devoting his time for some years to this very question of the origin of the gold deposits of northern Canada, and particularly those of northern Ontario. Some years ago in his paper on "The Origin of the Gold Deposits of Matachewan area" he gave the first conclusive proof of the connection of the gold deposits with the granitic intrusives, while a recent paper (Summary Report of the Geological Survey, 1921, Part C) proves that the gold deposits of Rice Lake district, northern Manitoba, have a like origin. Valuable contributions to our knowledge of the origin of the gold deposits of northern Ontario have also been made by the officers of the Ontario Bureau of Mines, particularly by Mr. A. G. Burrows and by Mr. P. E. Hopkins, whose recent report upon the gold ore deposits of Ontario reviews the subject in a very useful and comprehensive manner.

CHEMICAL EXPOSITION IN NEW YORK

During the week September 11-16 next, the eighth National Exposition of Chemical Industries will be held in the Grand Central Palace, New Cork. As this exhibition is designed to show not only the products and processes of chemical industry, but its raw materials, which are in large part mineral products, it is of prime interest to mining men. The Exposition has been timed to come between the meetings of the American Chemical Society in Pittsburgh, and those of the American Electrochemical Society in Montreal.

The Geological Survey, Ottawa, has just issued map No. 1882, *Bridge River (between Rexmount and Gun lake), Lillooet District, B. C.*, scale 2 miles to 1 inch.

A Mining Man of Two and a Half Centuries Ago.

II. ASSAYING

Sketchy and vague as Erckern and his translator, Sir John Pettus, may be in matters mineralogical, in many things pertaining to assaying they are, in contast, refreshingly clear and definitive. Teutonic terminology, as interpreted and adopted by Pettus, is easily recognizable in its similarity to that current today. In a general way the book could be used as a guide to assaying at the present time, although it would be found somewhat infirm.

The Assay Furnace and Accessories

"There must be special Furnaces (for Assaying)" we are told on page 8 "made of good Potters Clay, and bound with strong Iron wyre or Hoops, that they may not fall asunder by reason of the heat they must endure." It is noted that some diligent assayers "do adorn their Furnaces fairly and comely, so as they may be pleasing to the Sight." Our author hardly approves of this, for, says he, "This indeed do's give them an adornment, but there is no more done with it, than with a Common Furnace (that is made well though plain)". Lasting wisdom in these words!

The assay-oven of ancient times is first described. It was "made square, of strong iron Plates," and was, indeed, not much unlike such a furnace as any assayer might improvise today if he were cut off from access to supply houses.

The recipe for making a "special good loam" wherewithal to line and lute the furnace is as follows: "Take good and well-wrought Loam, beat among it Flocks of Wooll, or Horse-dung, Blood of Oxen, scales of Iron and common Salt". A lining of this material two and one-half inches thick was plastered in the furnace and dried. Then there was superposed on this a luting of a finely ground mixture of "Venice-glass, Bone ashes and a small quantity of Loam". After further drying, the whole was "nealed" by putting a "gentle fire in it." In this, on a finger-thickness of "Copell Ashes", was now placed the muffle. The luting of "Venice glass", etc., imparted a protective glaze, and all was now ready for the "tryal". The reader is warned that "if you intend to make anything of Clay, then you must add so much as the Clay useth to shrink, because one sort of Clay doth shrink more then another, but most commonly Clay doth shrink the tenth part."

There follows a meticulous catalogue of types and accessories, illustrated by delightful engravings.

Stress is laid upon the necessity of every assayer being able to design and manufature his own apparatus. To this end clear directions are given. "Take good Potters Loam (as good as may be had) but the Loam or Clay that is blew and becomes white in the fire, is found to be the best for use." After drying it in the sun, it is pulverized. To avoid adding too much or too little "Washings of Pebble-stones or very fine sand," trial crucibles must be made and tested in the fire with refractory or "hard flowing Oar". "Chalk stone" or "Talk" or "glimmer" was use by some unthinking persons to impart strength to the loam, but it is considered better by our author to grind up old pots and crucibles and add the grindings to the mix.

Brass moulds or frames were used for forming the crucibles. These were "anointed", with a little bacon grease. The pestle was called the "Monk". It also was "anointed" — quite appropriately. Muffles were painstakingly moulded on wooden "frames" or patterns. All were then baked in a kiln or "Potters Oven." Especial care was taken in choosing material for "Copels" (our "cupels"). Sifted and lixiviated boneash is highly commended, without any admixture with loam. The conclusion of the whole matter is that "when a man hath good ashes that are well washed good Copels may be made that need no mixture, and those Ashes may well be moistened with fair water, but the Copels are more brickle by it, and not so firm, as with the strong Beer or glew water." (We refrain from an unseemly jest about the former of these two moisteners.) Warning is given that the cupel must be brought to red heat before the assay is placed in it, as only thus "the Proofs (bottons) will not leap, but be purely finished... then may the Grain be taken off very pure and clean."

The Fluxes or "Fusses."

Preliminaries being done with, we now proceed to our fluxes, the first and last of which in assaying silver ores is "Lead Glass." "Lead glass is a Fluss, and is used to the very hardest and unflowing Oars... that they may as easily be boiled up as the soft Oars." To prepare this "fluss," "fair and white pibble-stones" are burned in a potters oven, pulverized, and passed through "an hair seeve." (Certainly a hair sieve must have been a trying device to work with.) The pulp was washed, dried, mixed with an equal part of "red Littorage or Littarge," placed in a crucible, covered with common salt, sealed with clay and strongly heated in a wind furnace. A second melting with "a little Niter" rendered the lead glass clearer.

The preparation of flux for good ores is tersely prescribed in one short paragraph: "Take one part of Salt Peter and two parts of Argol (both stampt small and mingled together), cause a glazed Pot to glow, put the matter into it, and cover the pot quickly, so the fluss will be presently burnt out and become a black grey powder... then is the fluss ready."

The Gold Assay

Silicious and non silicious ore were subjected to different treatment. Some common assayers roasted the "flinty harsh Oars," and quenched the roast "with Urine, or with a particular prepared Lye, thinking thereby to obtain the more." This was not, however, the approved method. In the latter, one part of ground ore, 15 parts of granulated lead, and one part of lead glass were mixed, placed in a crucible and heated and cooled alternately until the assay was clear. The lead button was beaten and cupelled and the resulting lead was parted in "Aqua Fortis". The remaining gold was "dulcified" with warm water, annealed and weighed.

There follows a long dissertation upon "Touch Needles" with which at present we have no concern.

It may be noted in passing that the standard of weight in calculating assay results was the "centner," 110 pounds at the Royal Mint, 100 pounds. An approximation to the "assay ton" was based upon the centner. "Therefore every assayer is to take heed with good Diligence, that he may order his Assayers this, that he may always find the Contents as near as he can, so that he may afterward in melting great quantities find the same according to proportion."

Assaying Copper Ores

"To the copper Oars which are to be proved for Copper, one must have little and good Crucibles for them, which the Goldsmiths do use." For the making of these crucibles and of the "little Ovens" in which they are used,

we are given explicit instructions. They differed radically from the furnaces used for gold and silver.

The flux prescribed is thus compounded: "Take two parts of Argol, and one part of Sulphur, grind them small and mingle them, put it in an unglazed Pot, then put live Coals in it . . let it burn till it gives over of it self, let the pot be cool, so the Fluss is prepared." This was effective only with "good and deft Cooper Oars." It was too weak for "flinty Oars, and there must something be added to it, as you will hear in the sequel." We learn then that refractory copper ores were to be finely ground and roasted (in successive stages both of grinding and roasting) "till it stinks no more Sulphurish." The aforementioned flux is now used with the addition of "flowing Glass Gall" and common salt. "Glass Gall" is, seemingly, speiss or slag, or both, from former assays.

The Weights Used

We cannot here do better than quote Pettus' own original definition of the assay centner. "It is considered only as a small Assay weight for trying how much a little Part of an hundred weight do hold of Gold, Silver, etc., whereby (as *ex ungue Leonis*) the whole proportion of the Lion may be known from his claw; so by the small Assay weight, the goodness of the whole piece may also be estimated. . . and this shews the skill of an Assayer in the skilful use of Arithmetick."

* * *

Assuredly every page of Sir John's contributions to the volume displays his "skill in the skilful use of rhetoric to hide the slimness of his knowledge.

* * *

In the next and last article we shall review Pettus' "Essays on Metallick Words", which is a highly original effort to elucidate textual and technical difficulties connected with the translation of Erckern's work.

CAPRICORN.

Correspondence

TECHNICAL JOURNALS AND TECHNICAL SOCIETIES

To the Editor,
Canadian Mining Journal.
Sir.

The invasion of the field of technical journals by engineering societies and mining institutes has received much criticism during the past few years. The members of the Canadian Institute of Mining and Metallurgy have now an opportunity of realizing why Mr. T. A. Rickard and others have raised strenuous objection to the journalistic activities of the American Institute of Mining Engineers. The campaign for advertising support for the publications of mining institutes brings out the fact that the ordinary member is becoming of secondary importance to the advertising member at institute headquarters. The difficulty of raising enough money to carry on the work of the institutes is rendering it necessary to supplement membership fees by advertising revenue. To get this advertising revenue the journals of the institutes are being made more and more to resemble the ordinary technical journals.

This endeavor to cover the field already covered by independent journals consumes money which the members pay each year for quite a different purpose. The publications of the institutes are made more attractive and newsy and considered from these points alone the member has reason to be pleased with the change. But to offset this is the fact that the status of a member has depreciated. He has become more and more regarded as an unprofitable subscriber, who will only be put in the preferred class if he helps to increase the advertising revenue. Even though his ordinary membership fees are two or three times the price of subscription to the mining journals, he is not paying his share of the expenses of the institute unless he advertises in the institute publications, which have been made more costly by the endeavor to change their character in such a way that they will appeal to advertisers.

There are many people interested in mining who are quite uninterested in the mining institutes. These people are quite as important factors in the mining industry as are the members of mining institutes. The men who prospect for minerals and the men who supply money for prospecting and developing properties are among the most important factors in the industry. Mining institutes do not have a large proportion of these men among their members, and yet it is in the interests of members that good mining journals should be available to these people at fair prices. Members of mining institutes defeat their own interests when they increase the difficulty of making mining journal profitable enough to warrant continual expansion and improvement. And yet, carelessly, I believe, many members of the institutes permit the use of the money they pay for membership fees for the purpose of building up a journal of a type more and more simulating that of established journals.

I have no doubt that this journalistic activity of the mining institutes is but a temporary thing and that it will die a natural death when members generally realize what is being done. In the meantime, however, your journal will doubtless feel the effects of the unfair subsidized competition, and I think it only right that the opinion of members should be asked for, with a view to determining what percentage of members approve the recent campaign for advertising.

Yours, etc.

A Member

Toronto, June 16, 1922

OPTION ON SCHUMACHER MINES

One of the largest deals in mining property for years back in Northern Ontario reached consummation today when officials of the Hollinger Consolidated Gold Mines, Limited, announced that they had purchased the Schumacher Gold Mines, Limited, which adjoins their property on the east. Rumors have been prevalent for some time that the Schumacher property, which comprises 160 acres, was much in demand and various companies as well as American interests were connected with the bid.

The Hollinger Company has been given an option on the entire assets, plant and undertaking of the Schumacher company for $1,650,000, of which $165,000 has been paid as a deposit. Within six weeks, which are allowed for an examination of the property, $300,000 will be paid provided the option is exercised. With the exercising of the option the balance of the purchase price is to be paid in four equal quarterly payments of $296,250 each. The carrying out of the sale will net the shareholders of the Schumacher company about 90 cents per share.

A notice calling a special general meeting of the shareholders of the Shumacher company for June 30 was mailed last Monday. This is for the purpose of ratifying and confirming the action of the directors of the company in giving the option and to authorize the sale.

Explosions and their Causes*

WITH SUGGESTIONS FOR PRECAUTIONARY OR PREVENTATIVE MEASURES TO BE OBSERVED

By ALEXANDER McEACHERN

Since the writer first entered the mining profession, some forty years ago, mine explosions have taken place at different times and in various countries. These terrible and sudden catastrophies attracted the attention of mining men everywhere, who began to seek a cause. In the early days of mining it was generally believed and accepted that mine or fire damp set off by a shot, the flame of an open lamp, or a mine-ventilating furnace was the main cause of explosions. Later on, however, after precautionary measures had been taken against gas explosions, it began to be doubted whether some other undiscovered agent was not at least one of the contributing causes of mine explosions. Doubt led to investigation and experiment, and although the search for truth took years of patient toil, during which time the coal industry developed rapidly, and many lives continued to be lost through the frequency of explosions, it was finally demonstrated that coal dust was not only a contributing factor, but was in many cases the real cause of some of the larger explosions.

It affords most interesting reading to a mining student to follow the different phases of thought and the different experiences as expressed in the written opinions of the leading mining men of the past, who made mine explosions a special study. To all such men we are deeply obligated, and in common with all others here today, I desire to express my indebtedness to those patient and in some cases brilliant men of former times. To the great men of our own day we are no less indebted.

Detection of Coal Dust as Explosive

About twenty-seven years ago, while employed as underground manager at Old Bridgeport Colliery, and standing on a headway watching a number of shots being fired, I remember seeing flame pass out of a room where the blasting took place, and travel out past the room end. I felt at that time that there was some other agent at work than explosive gas, and I began to seek for it. The mine had then an output of 800 tons per day, the total quantity of air returning to the furnace was only 18,000 cu. ft. per minute, a small quantity indeed compared with present-day volumes. There was no explosive gas present in this part of the mine at that time, and one would naturally suppose that unless the flame was fed on the way, or accelerated with more than ordinary force, it would die out quickly from the lack of oxygen, and also on account of the presence of a certain percentage of carbon dioxide, but such was not the case.

While manager in No. 2 Mine, Glace Bay, in 1902, there were four cases where men were badly burned by flaming shots. In one of the instances three men were seriously burned; three mine officials and the miner himself had examined this place before the shot was fired, but no gas was found. After this the use of black powder was discontinued, and compressed powder was introduced to prevent flaming. In some cases of flaming shots the coal itself caught fire, and was with much difficulty extinguished. The writer finally became convinced that gases liberated from the coal and those generated in the process of blasting (chiefly carbon monoxide) acted as agents to set off the explosion, and that these were stimulated by coal dust, as there was no explosive gas present in the place where this flaming occurred. Among mining men (the writer included) there began to be doubt as to the part coal dust played in explosive mixtures. To offset this suspected danger, watering of the mine was begun. Pipe lines were laid into all sections of the mine. This was the first known instance of systematic watering in Eastern Canada. In addition to this the dust was gathered up and loaded away.

Coal Dust in European Mines

In respect to precautionary measures against coal explosions, we were then perhaps as far advanced as many European countries. The first record of the influence of coal dust in mine explosions is contained in the report of John Buddle on the Wallsend explosion in 1803. He states that the mine workings were dusty, and some of the survivors were burned by sparks from ignited dust. In 1844 Faraday and Lyell drew attention to the effect of dust in extending the explosion in the Haswell Colliery in that year. Speaking at the Royal Institution Faraday said, "The ignition and explosion of the fire damp raised and kindled the coal dust, which is always pervading the passages, and these effects must in a moment have made the part of the mine which was the scene of the calamity, glow like a furnace."

M. Vital, in 1875, proved that fine coal dust would increase the intensity of a fire damp explosion; Wm Galloway came to the same conclusion in the same year; but notwithstanding all this, in 1882, M. Mallard and M. Le Chatelier, members of the French Fire Damp Commission, recording the results of their investigations, said that coal dust was not a serious danger, and that no colliery explosion of any magnitude could be traced to it.

Thus up to 1891, the large-scale experiments of Galloway, Abel, The Chesterfield Institute, and the more important ones of Hall and the Austrian Commission were inclusive. In the final report of the Austrian Commission, it was stated that their experiments confirmed the results of their previous investigations, but showed that the dangers were much greater than had hitherto been admitted. They concluded that black powder and similar explosives were dangerous and should be prohibited in gaseous mines. They showed that the explosibility of coal dust depended more upon its physicial than upon its chemical composition. They classified the various kinds of dust as (a) explosive, (b) slightly explosive, (c) inflammable, (d) safe.

Researches in England and France

A Royal Commission, to investigate the question of coal dust explosions in mines, was appointed in England in February 1891, and began hearing evidence in the following month. Its first report of evidence, without conclusions, was published in July of the same year. In 1892 its sittings were adjourned pending further experiments by Mr. Hall, which were conducted at intervals in that year and in 1893. The Commission made its second report in 1894, giving the additional evidence and their final conclusions, which were summarized in the following words, 1. The dangers of mine explosions in which gas exists is largely increased by the presence of coal dust. 2. A gas explosion in a fiery mine may be

* Paper read before the Mining Society of N. S., May 192[illegible]

interrupted and carried on indefinitely by coal dust raised by the explosion itself. 3. Coal dust alone, without the presence of explosive gas, may cause a dangerous explosion, if ignited by a blown out shot, or a violent inflammation; but to produce such results, however, conditions must be exceptional, and are only likely to be produced upon rare occasions.

After this, a second Royal Commission was appointed, which began hearing evidence in June 1906. The second report of this Commission appeared in 1909, and the coal dust question was discussed, together with other questions. Witnesses who included those best qualified by scientific knowledge and practical experience to deal with the subject, expressed opinions which were often widely divergent, but which generally agreed that coal dust was liable to explode, with or without the presence of fire damp.

After the Courrières explosion in France in the year 1906, the French established a testing station at Lievin, to study the relative explosibility of the different coal dusts, and as had been proved at other European testing stations, it was found that there was no difficulty in causing explosions of coal dust without the presence of fire damp, by discharging black powder or dynamite from a cannon at the end of the gallery. Although there was no official report attributing the cause of the Courrières explosion to coal dust, it was the general opinion of the English investigators that this was the cause.

Pittsburg Testing Station

In the United States, the greatest coal producing country in the world, the coal dust factor attracted scant attention until 1907, when the total death roll in that one year from so called "windy shots" and powder explosions, reached the appalling total of 1148. Mr. Geo. S. Rice, who summarized the results of these explosions, said that these powder and "windy shot" explosions were in reality dust explosions. While it is true that they generally originate from a blow-out shot, it is without question the coal dust that carries the flame and death in its trail.

From the above, it will be seen that no definite conclusion had been arrived at in European countries until 1909, and in the U. S. A. not until after the disastrous year of 1907, when they had so many deaths from this class of explosions. In 1910, a station was erected at Pittsburg, and a mine was started also for the purpose of finding out if coal dust could be exploded in the absence of explosive gas. The result of the findings of both the testing station and the mine, was that coal dust could be exploded, and did explode, in the absence of explosive gas. In Canada, unfortunately, there are no testing stations, and some mining men and numbers of miners may be found who doubt that coal dust will cause an explosion in the absence of other explosive agents.

Thus, the summary of the latest reports on explosions is fairly conclusive, and the essence of it is, that there are two principal causes for explosions, explosive gas, and coal dust, and of the two coal dust is more insidious than fire damp. The fire damp carries its own flag of warning in the shape of the cap in the safety lamp, but coal dust does not attract attention until present in large quantities. Fire damp is usually of local occurrence, and except in notable and very exceptional cases, is controllable by careful manipulation of the ventilation currents. If, by mischance, a body of fire damp is ignited in the mine, the force of the explosion is terrific, but the effect is localized unless dry coal dust is present, or unless, as very rarely happens, an explosive mixture of methane and air extends throughout the mine.

Stone Dust and Water

Various methods have been devised for dealing with an explosion that has occurred through the temporary failure of the methods for neutralizing the explosive dust. Experiments were tried in the workings of Lievin. In the path of the dust explosions, short zones were prepared, in which dusting and watering had been carried out to the limit. A study of the results of these prepared zones led to the conclusion that a moderate length of well-watered gallery has a modifying influence on the propagation of explosions, and that the efficiency of such zones, considered as means of not only moderating, but completely suppressing the explosion, depends upon a number of circumstances, notably the intensity of the initial explosion, the length of the arresting zone, and the degree of humidity. Briefly, a zone of 100 yards, which has been treated with a weight of water equal to four times that of the stone dust, would resist, probably, the progress of the flame of an explosion occurring within the previous 100 yards, but would not be sufficient to arrest the flame from an explosion of much greater violence.

The efficiency of arresting zones treated with stone dust only is practically nil; even when the initial explosion is slight, and the zone is 150 yards long, to be of any use, the proportion of incombustible material must be in excess of seventy-five per cent. Although the watered zone is clearly superior to that treated with stone dust, the method of providing arresting zones is of little value when a violent explosion occurs. When the road is dusted only, the powerful blast of air in front of the explosion mixes its inflammable dust with that of the surrounding galleries, and carries the incombustible stone dust ahead of the flame, thus rendering it useless. When the isolating zone has been freely watered, it is true that the inflammable dust it contains will not rise, but the blast of air carries along sufficient material to propagate the flame through the watered portion of the workings. Although the evaporation caused by the passage of the flame tends to cool and finally extinguish it, this action would have to take place for a considerable time. The arresting zones, then, are not effective when a violent explosion occurs, because, owing to the evaporation caused by the ventilating air, it would be impossible to maintain over a sufficient length, the degree of humidity necessary for success.

Preventative vs. Palliative Measures

From the foregoing the reasonable conclusions are that no practicable method has been found to arrest a violent dust explosion in a dry and dusty mine. It therefore becomes necessary instead of attempting to arrest explosions to remove the causes, and use preventative measures as far as reasonably practicable. Let us first look into the nature of a dust explosion. Where a source of heat, such as an incandescent wire, an electric spark, or the flame from a blown out shot, is introduced into a cloud of coal dust, rapid combustion takes place between the particles of the coal dust and oxygen of the air. If the quantity of heat transferred to the dust cloud is relatively small, combustion may proceed only in the immediate vicinity of the heating agent; if on the other hand, sufficient heat is available, the temperature of the dust cloud is raised to such an extent that combustion takes place, developing more

heat than can be readily conducted away; consequently the adjacent parts of the dust cloud are heated to a temperature sufficient for rapid combustion, and by its combustion it develops heat, which in turn raises the temperature of the next dust layer. This process continues, and the flame travels through the dust cloud with rising temperature and increasing velocity. When the conditions are favorable, a true dust explosion results, and the velocity of the flame rapidly increases to over 2,000 ft. per second, and great pressure is produced. In coal dust explosions pressures have been known to increase to 119 lbs. per square inch, after they had travelled a distance of 750 ft. from the point of origin.

There are various methods of controlling, resisting or limiting these explosions, but the two principal ones are: — 1. humidifying the air currents by water sprays, and water zones; 2. inoculating the air currents with stone dust, and stone dust zones. These zones must be within a reasonable radius of the parts of the mine where blasting is done, and it is necessary to prevent shots from being fired in any other part of the mine, other than the working places, without the written consent of the Manager, stating the conditions, and the precautions to be taken before the shot or shots are fired.

Stone Dusting on the Continent

It may be interesting at this point, to look into the system of stonedusting in the Continental collieries. In general, stone dusting is confined to main roads and airways,—sometimes the inclines as well,—the precautions at the face and in the gate roads being limited to increased care in preventing the risk of ignition in shotfiring. With this object in view, the blasting charges are not allowed to exceed 250 grams, or 9 oz. in each hole. The cartridge is encased in waxed paper. Shot holes are carefully cleared of dust and stemmed up to the mouth. A plate of sheet iron, 10 in. by 32 in. at least, is set up a few feet from the hole, and all coal dust in the intervening space is removed. Workings are divided into districts, which are insulated form one another by means of barrages, etc. This is to limit as much as possible the propagation of the explosion, should one occur.

Summary of Preventative Measures

To summarize briefly, some of the preventative measures are; seeing that the dust from the screen on the face does not enter the air intake to the mine; taking extra precautions with respect to safety lamps; setting up walls of non combustible dust or water vapor between the particles of inflammable coal dust, or if reasonably practicable a combination of both. These walls should extend sufficiently far away from the working places, or the places where shots are fired, to prevent ignition of coal dust from the flame of a blown out shot, a windy shot, or a shot that has been overcharged. In addition to this, water or stone dust zones should be prepared in close proximity to the places where explosives are used, for the purpose of dividing the mine into districts, isolated from one another, and thus helping to prevent the spread of an explosion if one should occur.

It should be seen that all fine dust is taken out of the mine as far as practicable, that roads are ballasted with non-inflammable material, that mine cars are properly built to prevent dust escaping, that sprays of water are turned onto the top of the coal to prevent dust rising from the mine cars, that shot holes are properly cleaned, and are not gripping or fast; that the charge of explosive is limited to the prescribed amount as determined at the testing stations, and that all dust is allowed to settle before shots are fired. Tamping should be done with non-inflammable material, bearing in mind that tamping with clay containing 11 per cent. of moisture gives the most efficient results, increasing the useful energy of the shot to about 93 per cent. Moist tamping therefore does two things, it increases the efficiency of the shot, and also increases the safety.

It should be seen that ample time is given between shots, 1. to allow the heat generated by blasting to pass off; 2. to give the surrounding air time to dilute the gases generated by the explosive, and liberated from the coal; 3. to allow the dust to settle; 4. to render it non explosive by treating it with stone dust or water vapor.

Safe Explosives Practice

Having dealt with some of the precautions to be taken with respect to blasting, it is now important to deal with explosives, stating the precautions necessary with respect to their use, if we are to have a reasonable assurance that no ignition of gases or dust will take place from the blasting. The ignition temperature of all explosives exceeds that of all mine gases, but fortunately, the duration of flame of permissable explosives is much shorter than that required to ignite gas. The duration of the flame of permissable explosives is only a fraction of a second, while it is said to take as high as ten seconds to ignite fire damp, which is the chief mine gas.

The difference between permissable and non permissable explosives is clearly brought out in a comparison of black powder and ammonium nitrate. The ignition temperature of ammonium nitrate is 1121 degrees centigrade, that of black powder is 2215 degrees, or nearly twice as great. The duration of the flame of black powder is between 2,000 and 1,000 times as great as that of ammonium nitrate. In this connection also, the importance of detonators should not be overlooked, and a weak detonator should never be used.

If the above precautions, particularly with regard to limiting the charge of explosive to conform to the standards as set by the testing stations, and neutralizing the inflammable dust are observed, it will go a long way towards insuring safety in our mines.

In presenting this paper to the Mining Society, I take the opportunity of expressing the pleasure it affords me to be able to add my experience to that of other mining men. Each mining field has its own problems to solve, but in working these out, the essential qualities needed everywhere are close application to [illegible] and the determination to succeed.

An enterprising foreigner, said to be the editor of a Carpathian newspaper published in New York, was arrested in Herkimer, N. Y., on May 19th, on the charge of being one of the six promoters of the bogus "Yankers Gold Mine." Vasily Cherepuk, the arrested man, carried with him documents showing that he had secured a six months option on a Herkimer County farm, the consideration being $2,000 cash and [illegible] shares in an operating company. [illegible] Platinum Gold Company, Inc." A bag of [illegible] mud from Herkimer County was found in the [illegible] where the prisoner lived. He and his associates are charged with the fraudulent sale of more than $200,000 worth of stock.

News and Comments

BY ALEXANDER GRAY

Victoria Cross Mining Hero

In these buoyant days when prospects are capitalized at a million or two, and mills are planned before sufficient ore for conclusive mill runs is developed, it is heroic to have a young Mining Engineer do a daring deed entitling him to the Victoria Cross—for he risked his official life. The property, or properties, shall be nameless. They were merged. One had a mill and put through some ore, the heads being heralded as most satisfactory, but the ore broke badly. The other had been prospected in a way, but had little other than proximity to warrant its being linked up with the property with milling equipment. It was resolved by those interested to amalgamate the areas. Acreage, plus new capital, it was in felt, would make a stronger combination. So, the details being arranged, a capable, highly thought-of young Engineer was put in charge. And what did he do? Well, that brave man sent for an able-bodied carpenter, told him to find the necessary plankind, and nailed up the mill! He did not put up a sign reading: "Those who enter here leave hope behind". He declared a close milling season, and this as his policy:

"I'm going to see if I can find enough ore to feed a mill".

Yet he has not been decorated!

"Smelters" Gathering Momentum

Ratification by shareholders of the $6,000,000 convertible bond issue came as a matter of course; so the Canadian Consolidated Mining and Smelting Company will have a clean sheet and a concentrator for the Sullivan Mine. Private enterprise will supply hydro-electric power. These twin economies are what the Sullivan needed, instead of shipping raw ore to Trail and having somewhat expensive power, however capable the management. So great a mine can stand almost anything, if it has to, but the concentrator on the spot will permit of run-of-mine rock being treated as well as the higher grade. Until now the Directorate has not been able to put its plans into effect. The bond issue meets the entire fiscal requirements, and hastens the day when Consolidated will earn larger profits and command greater respect in metal markets. Moreover, the concentrating department at Trail automatically will become available for general business on behalf of other producing companies, and incidentally of those Rossland ores of which the Consolidated has a goodly share. By having this capital expenditure and the added efficiencies it will provide, the Consolidated will go a long way toward meeting the requirements of British Columbia as a whole, and the Canadian Pacific Railway will have its compensations. The Pacific Province is fortunate in its possession of diversified minerals. Sympathetic metallurgical works, reasonable freights, and lower operating costs are inducements likely to attract discriminating capital.

Northern Explosives, Limited

Having a market with its affiliated corporations in the Maritime Provinces, Quebec and Ontario, the new Northern Explosives Company will undertake to cover broader fields. The line-up is indicated by the roster of the officials, as follows: D. H. McDougall, president; W. A. Layfield, vice-president in charge of operations; George C. Riley, vice-president in charge of sales; Alex. Fasken, secretary; J. B. Waddell, C. M. Doolittle, C. V. Corless, W. J. Webster, J. P. Bickell, J. F. Van Lear, Leonard Richards, jr.; Leland Lyon, George E. Leighton, comptroller, and E. V. E. Bard, plant superintendent.

Manifestly British Empire Steel and Coal, Dome and McIntyre Gold, Mond Nickel, Consolidated Asbestos, Provincial Stone, and other interests are identified with the organization, which is capitalized at $1,500,000, with 15,000 shares of $100 and 5,000 preference 8 per cent. shares. All the capital stock is issued.

The former site of the Curtis and Harvey plant on the Ottawa Canadian Pacific short line has been secured and approximately 100 persons, it is understood, are employed, a production this year of five million pounds of high explosives being anticipated. The plant, it is said, will lend itself to extensions at slight additional cost, the idea being to avail of regulations covering permitted explosives for coal mining purposes. Seemingly Atlas Powder Company, of Delaware, formulas will be availed of. The Atlas people have fifty per cent of the total capital issue. When the Company's features have been rounded out, it is the avowed intention to manufacture by-products, such as celluloid and leather cloths, the latter entering into automobile upholsterings.

Giving Canadians The Adargas

The Buffalo Bond Corporation has favored Canadians with a folder containing glowing accounts of the stupendous worth of the Compania Minera San Pascual De Las Adargas, S.A., Mexico, capitalized at 20,000,000 pesos—or dollars 'Mex".

Irreverent persons, given to profanity, might misinterpret this as a new-fangled gas (or a "gift-bearing Greek") were it not that Conrad E. Wettlaufer, of Buffalo, is President, and is qualified to prescribe substantial stimulants.

The Vice-President and Managing Director is Paul Ginther, a seasoned promoter not unknown to fame in select Toronto circles. Mr. Ginther has a penchant for profits—a commendable trait—if. Those Canadians who partook of Parral properties have not waxed wealthy by following Mr. Ginther's lead.

Perhaps, as strenuously maintained, Adargas is different. The folder bearing the name of Arthur G. Penman of Toronto, has it that the Adargas is a "group of mines", has been worked for ten years, and is liable (more than liable) to last forever and thereafter. To quote the folder verbatim: the properties are "estimated by eminent engineers to contain an inexhaustible supply of gold, silver and lead ore."

That will do. We are unconcerned about what the ore reserves will be in the Life Everlasting, when money, marriage and giving in marriage will be verboten.

Managing Director Ginther does not indulge in this limitless projection. The brokers did that. Mr. Ginther rests his case upon the assertion "there is enough ore in sight and ready to ship, at the bottom of only one of the eight shafts now open on the property, to keep the mine running at the rate of 500 tons a day for a period of five years, without touching any of the other ore bodies that have been exposed, some of which run assays as high as $400 a ton."

It is not claimed that this tonnage is in the sump at the bottom of one shaft. The ore "is ready to ship", seven or eight hundred thousand tons of it, to say nothing of the other seven shafts and all the high-grade there. Just as soon as a 14-mile railway is finished and rolling-stocked,

and a plant adequate to handle 500 tons per day is provided, there will be no curfew bells around Adargas premises. Oh! Boy!

With "not a dollar of debt", at this writing, (everything having been paid for "in advance"), Mr. Hugo Schoellkopf, Treasurer, saw to it that every peseta reached its destination and found its worth.

Once shipping commences "production promises" to reach (at a low estimate) throughout eternity, "the astonishing sum of $9,000,000 per annum."

No less important to Canadian recipients of this unpretentious folder, is the announcement that Joseph C. Houston, erstwhile of the Right-of-Way, Porcupine Crown, Schumacher, St. Anthony, etc., and "the man who put the Dome Mines in Canada on a paying basis," as the document reads, is the Mining Engineer in charge of the Adargas. His presence and his expressed optimism suggest that he substantiate some of the estimates and the further claim that the Chihuahua Mining district has "produced more of the previous metals than any other region on earth". Undoubtedly Mr. Houston has had varied experience and possesses versatility. He may not insist that he alone and unaided "put the Dome Mines on a paying basis"; yet that is a trifle alongside of this capsule from the brokers:

> "Estimates by competent and accepted mining authorities indicate that all of the mines listed above (Dome, Hollinger, Lake Shore, McIntyre, Schumacher, Wright-Hargreaves) could be dumped into part of the mineralized acreage of Adargas and, with equal equipment, Adargas could produce several times the combined earning capacity of all the above mines".

That being so there is singular apathy in not planning more than a small mill and talking of only $9,000,000 per annum regardless of Father Time and his reaping iron. This does not imply that it is not an act of magnanimity, even though it be an afterthought (since Buffalo and environs are well supplied with Adargas shares) for the officers of this company and the formidable Advisory Board, which included Mr. Houston and the capable A. G. Kirby, to permit Canadians to contribute $1 a share. Messrs. Houston and Kirby are so well known in Canada (notwithstanding Mr. Ginther needs no introduction) to vouch for so much that it requires sedatives which the technical chiefs can supply. Mr. Houston feels "that when the property is properly opened up it will develop into one of the most productive mines in the Republic".

It almost seems as if Mr. Houston and the forecast recorded in the folder, are not in harmony. If the property is "inexhaustible", why is Mr. Houston so reserved?

Pending explicit details, subscriptions for shares need not be telegraphed. Accepting the suggestion of Mr. Houston, "when the property is properly opened up", it will be time enough to buy, even at a premium upon the price now quoted.

While on the subject of this extraordinary Mexican proposition, which Canadians are asked to support, it is pertinent to add that a leading Mining Engineer, respected and popular throughout the Ontario North Country, visited the Adargas about two months ago. *The Mine had not been de-watered,* according to his statement. Its everlasting ore reserves were not on exhibit.

Elbow Lake Sampling Results

Superheated air to the contrary, and painful as it may be to record the fact, initial Elbow Lake sampling results have not evoked other than a doubt around Hollinger premises. Enrichments and impoverishments are extremes which may not meet—and, to be frank, that is why President Noah A. Timmins went there. A final decision may be deferred and it is hoped there will be a revision of preliminary judgment; but the sum and substance of what has been shown rather tends to the belief that the section needs careful determination—by those who can afford to make it. Where there is a chance—a sporting chance—Mr. Timmins always has been an optimist. There are spectacular features in and about the Murray claims held by individual Hollinger Directors. Whether the lean will dilute the fat "spatterings" (as the advertisements describe them) to the point of unpayability, is a question that is in the balance. One authority, whose opinion will be more or less decisive, "does not like it". Possibly this may not be the best Elbow Lake has to offer. It would be unfortunate to have an adverse decision so soon. Nevertheless I give the situation as I get it, for what it is worth to those who may not have a thank you for the information. Too many fast-days make an occasional Lucullian feast enervating rather than nutritive.

Overproduction of Superlatives

There is considerable risk in the overproduction of adjectives, when they are so promiscuously superlative. The promotor has an inexhaustible reserve of these, but the public may not be able to supply the necessary if the "greatest ever" mines or veins "follow fast and follow faster" in the advertising columns of the daily press. Lightning River, according to representations, has the longest, strongest, richest ore body in the Northland. The sufficiently-excellent Lake Shore has something unparalleled—good enough in all truth without stretching it. In reality there is nothing in common between Lightning River and the Lake Shore, other than that developments at the latter are eminently satisfactory and do not need exaggeration. Not to be outdone, Harper, Mount and Company, the firm that recently announced Hollinger Consolidated had ore enough to cover milling requirements for forty years (say a paltry 60,000,000, or 80,000,000 tons) offers the Chaput-Hughes as a near greatest. In so doing, these gentlemen felicitate their clientèle upon the fact (no doubt it is a fact) that "there are only 1,400,000 shares of this stock outstanding". The diminutive issue is intentionally so. At 28 cents, the total market valuation of the property undoubtedly "would only amount to $392,000, or $3,150 an acre", which is ridiculously low for something contain a "golden opportunity for tremendous profits". That word "tremendous" is preferable to "unbelievable wealth", as applied to some Elbow Lake prospects. It provides gusto, there is no negative element. "If Chaput Hughes was producing gold the shares would easily be worth a dollar"; nor would they stay there. Yet "you never can tell" Why it should be reasoned that Chaput Hughes has a chance of duplicating the Lake Shore, which "has located $18,000,000 in ore", or why it is assumed Chaput Hughes is "in the same area and the same vein system" as the Lake Shore, Teck Hughes and Tough Oakes,—well, perhaps Attorney General Raney can find a reason why it is not. "Area" is a very broad generalization. "Vein system" is definite. "There isn't much of our original allotment left", the Montreal Mining Exchange brokers assert. That, too, may be another argument in favor of checking up the assertion that the producing mines of the Kirkland Lake "area" are in "the same vein system as Chaput Hughes". What the Chaput Hughes has and what its near by northern neighbors have, is more than the difference between Tweedledum and Tweedledee. All of which does not imply that the Chaput Hughes may not have something worth having more of. It needs less imagery, a trifle of the positive rather than the superlative in its literary output. The "pleasures of ignorance", putting it mildly, are expensive.

News of Mining

United States

In the construction of motor cars and trucks in the United States enormous quantities of metals are used. During the year 1921, 1,514,000 passenger cars and 151,550 trucks were built. The iron and steel used amounted to 1,464,000 tons or about 4 per cent of the country's output; 43,250,000 pounds of aluminum, 22 per cent. of the total output; 83,425,000 pounds of copper, 16 per cent. of all produced; 12,510 tons of tin, or 20 per cent. of the country's supply; 6,670 tons of lead; and 3,400,000 pounds of nickel.

The American Gold and Silver Institute advocates the organization of a United States export silver association, strong enough to control and stabilize the market by extending credit to such United States producers as may require it and by placing itself in a position to be able to purchase the world's entire supply. It is pointed out that the United States and Mexico produce 70 per cent. of the world's silver and that London control is based upon the speculative demand for the metal in the Orient. The purpose of the organization will be to become active after United States Government purchases under the Pittman Act shall have ceased.

After very acrimonious and protracted debate, the Finance Committee of the United States Senate has been overruled by the Senate in reference to the proposed duty of 10 per cent. *ad valorem* on cyanide. All cyanide compounds were returned to the free list.

The last week in May witnessed a slight gain in the supply of bituminous coal. Visible stocks in hand, however, are rapidly reaching the vanishing point. A return to normality in freight rates and wages, it is predicted by a few publicists, will come before September first. However this may be, there is a singular lack of interest in the strike situation. Rarely has the public paid less attention to the causes and merits of a national labour movement. The Hoover Conference at Washington, however, is being followed with interest. Mr. Hoover, in opening the conference, declared that in "times of emergency some one must take the responsibility, assume the leadership, and say what is fair. I do not believe a man is worthy to hold public office who will not assume responsibility in times of emergency... I propose to inquire through you as to the situation in various districts and I will take the responsibility on my own back and will ask every operator to accept this basis in his own district."

In the first week of June copper prices were steady and higher at 13.875 cents and 14 cents, the latter price for carload lots. High-grade zinc advanced to 6 1/8 cents; lead, 5.65 cents to 5.75 cents. Silver was steady at over 72 cents per ounce.

Great Britain

Under its present management the South Crofty tin mine, Cornwall, has had twelve years of prosperity, out of fourteen years of operation. The South Crofty management had asked permission of their mineral lords to stop pumping. The mineral lords acquiesce on condition that the incoming water should be dammed. The inspector of mines, however, refused to authorize the building of underground dams on account of the dangerous nature of the work. In this impasse the Government Trade Facilities Committee came to the rescue and advanced £30,000 to finance the re-equipment of the mine. New pumps are now being installed and the lower levels are being developed.

The British Ministry of Labour reports a slight increase in the number of wage earners at work in the collieries at the end of April, the total being 1,088,512. The number of days of pit operation per week was also larger, being 5.30 as compared with 5.17 in March. Reduction of from one to 2 per cent. in weekly wage rates were partly offset by corresponding increases in Northumberland and other districts.

The total saleable coal raised in Great Britain during the first quarter of the current year was 61,000,000 tons, about 7,000,000 more than was raised in the corresponding period of 1921. The number of persons employed (above and underground) was 1,091,000 for 1921 (1st quarter) and 1,233,000 for 1922 (1st quarter).

In answer to questions asked in the British House of Commons, it transpired that the Geological Survey has a staff of 84 as compared with 51 in the year 1914. The yearly expenditure is now £44,560 as compared with £16,828, in 1914. The scope of the Survey's activities has not been expanded.

At Scottish coal mines there are now 25,100 surface workers and 100,900 underground. During the first quarter of 1922, 41 persons were killed and 161 seriously injured.

On May 22nd, English and Welsh companies put into effect reductions in freight in rates in iron and coal. Scottish railways do not participate in this reduction.

Europe

The Swedish Government has overridden the Swedish Railway Board's recommendation against the use of Spitzbergen coal and has placed contracts for delivery of coal with the Spitzbergen Coal Company for this summer and for the summer of 1923.

With certain provisions and conditions, the German Government is now permitting the importation of foreign coal free of duty. This arrangement will obtain until the end of August.

The French *Société de Nickel*, operating in New Caledonia, has issued its report for the year ended June 30th, 1921. In January, 1921, the sales of the *Société* fell 50 per cent. Labour difficulties were met in part by importing workmen from Indo-China. High fuel costs had caused the shutting down of the Company's foundry. The utilization of water-power, to be completed within two years, will bring much-needed relief.

Poland's production of crude oil has fallen, almost continously, since 1910. This is due largely to the exhaustion of the Borysław-Tustanowice district. The Polish Government offers large concessions and wide privileges to companies that will undertake the sinking of wells in new districts. At present crude oil is being much used for power generation owing to the shortage of coal.

Australia

The New South Wales Board of Trade has fixed the basic market wage for the State at £3.18s. per week. This is a reduction of 4s. 1d in the existing rate.

The Australian Miners' Federation Executive has formulated a plan whereby, "job control" is to be established. No union member is to leave one calling to accept work in another without permission of the district secretary. Members of Unions will refuse to work with a new em-

ployee until he produces a note from his district secretary. Fines and penalties are provided to enforce obedience.

For the first three months of the current year the gold output of the State of New South Wales was 8740 ounces as compared with 15,628 ounces for the first quarter of the year 1921.

Africa

The Fanti manganese ore deposits, Gold Coast Colony, controlled by the Fanti Consolidated Mines, Limited, are being opened up and equipped for large production. The ore is reported to contain 50 to 53 per cent. manganese, 2 to 4 per cent. iron, 3 to 7 per cent silica, and 0.1 to 0.12 per cent. phosphorus. Up to the end of 1920, in a short period, the company shipped 140,000 tons of detrital ore. This was mostly made up of clay-coated boulders from which the clay was easily washed. The known ore bodies are estimated to contain 3,000,000 tons. To equip the property for the production of 200,000 tons per annum will cost in the neighbourhood of £250,000, including the establishment of lighterage facilities for transshipment to steamers. Geographically the property is advantageously situated compared with other European and Asiastic producers.

A strong movement is under way in mining circles on the Rand to supersede the established method of measuring efficiency by the cost per ton of rock mined, by the cost of gold per ounce produced. Too much rock is being mined. Stopes are too wide. In some instances the waste rock mined exceeds 75 per cent. of all material handled.

No effort is being made to utilize the sand and slime dumps on the Rand for the manufacture of bricks. Small plants are now in operation near Dreifontein Station. Government tests of the products have been favourable.

Asia

A forecast of Japan's output of coal for 1922 places it at 25,700,000 tons. As the estimated consumption is 24,200,000, the balance is not large. The decision of the Japan Coal Miners' Association to curtail production has been modified by the fact that prices have steadily advanced. Exportations for the year are estimated at about 2,400,000 tons.

QUEENSLAND COAL FOR AMERICA

The coal mining industry of Queensland has of late presented several interesting and important features. A 6 ft. coal seam was discovered on the Bowen Coalfield railway line, about 4 miles outside the State Coal Area. Commenting on the find, the Minister for Mines (Hon. A. J. Jones, M. L. A.) said that the seam had shown 6 ft. of thickness when the telegraphic advice was despatched to the Department, and then had not been fully penetrated. It has been decided not to grant any licenses or leases in the vicinity until full reports have been received. On the Styx River, the Department of Mines is equipping a new colliery. This action is warranted by the discovery of four more eminently satisfactory seams, and the boring operations which are being conducted give promise of additional important developments. Mr. J. W. Brophy, General Manager of the State Steel Works, has been appointed Superintendent of State Coal Mines. His duties will be to deal with the economical working of the mines and to supervise their management. On him also will devolve the securing of trade, both local and overseas, the equipping of new mines, such as the one at Styx River, with machinery and plant, and conducting boring operations for coal. The Department considers the coal at Styx River to be the equal, at least, of any gas coal obtainable in Australia, and are preparing for production on a large scale. With the construction of the Railway to the State Mine at Bowen, which should be accomplished before the end of the year, export business in steaming and coking coal will be practicable. It is the intention of the Government to establish trade connections with the United States of America and with the far East.

RIBBLE MINES

Ribble Mines Ltd., which a few months ago acquired a controlling interest in Wasapika Consolidated is now developing the property. President Rogers who was in Toronto for a few days last week states that drifting is in progress north and south at the 100 ft. level and that the shaft is being timbered to the 200 ft level. Drifting on the second level will be begun soon. Eighteen men are employed.

The company is also having a survey made of the water power on the Montral river at Ribble Falls a few miles from the mine. Preliminary estimates by the surveyors indicate that between 700 and 1000 h.p. can be developed here.

The road to the mine from Westree station has been much improved during the past year and it is now possible to travel the road in motor cars. Westree has been made a regular stop on the National Railway. It is twelve hours from Toronto to Westree on the Winnipeg train. The increased traffic to West Shiningtree has resulted in the improved passenger service and the operators expect that the railway will soon provide improved freight handling facilities at Westree station.

Ore being encountered in the drift on the Ribble vein is well mineralized with pyrite. Engineers who have visited the property recently have remarked on the similarity of the ore to that of the producing mines at Porcupine. The ore is pyritic quartz and with the grey carbonated volcanic rocks that enclose the quartz the similarity to the Porcupine deposits that are producing most of Ontario's gold is striking. Those who know the West Shiningtree area only from the results of early surface examination will find a visit to the area now well worth while. There is Pullman service now from Toronto to Westree and motors on the road to the mines.

The directors of Ribble Mines Ltd., are George R Rogers, R E. Hore, J. E. Day, L. J. Labay and J. t Mahon. Mr Rogers is president and general manager Mr. Hore is vice president and consulting geologist.

A correspondent of the Sydney (Australia) "Morning Herald" describes the present state of the mining and metallurgical industries of New South Wales as lamentable — "languishing, practically dead, oppressed by labor union domination high wages, short hours poor quality of labour, unduly high freight rates, increased smelting and refining charges, added costs from awards," and other distresses too numerous to detail. He states that nearly every mine is closed down. Here are 10,000 unemployed, and that the Government's action in assisting Broken Hill strikers with £50,000 was about the last straw.

A plant for manufacturing asbestos products is to be established near Perth, Western Australia, under the auspices of the State Government. It is considered probable that the Government will also assist mine owners with cash subsidies.

Notes From Nova Scotia

Mines and Mills Busy Again

"Our Isle is full of noises, sounds and sweet airs, that give delight and hurt not". They are the noises of the mine, the workshop and the factory. The low hum of machinery, the whirr of rapidly revolving wheels, the pulsating of the great engines and the hearty voices of the workers all tell of new life throbbing through the veins and body of the two giant industries of Cape Breton — coal and steel.

Already coal is rising to a normal output and in a short time will exceed it. Collieries that have been dormant for over six months are now in operation, while a half-constructed colliery is again the scene of much activity. The word has been spoken and "every man is expected to do his duty."

It's "braw" to see the ships coming in for Cape Breton coal, great ten-thousand-ton cargo boats, taking away at one load three-fourths of a day's output. A short time ago fears were entertained in some quarters that the four hundred thousand tons of coal now in the stock piles might not be lifted this season and that a dull winter would naturally follow. But the steam shovels are busy, and we hope to see the coal heaps quickly transported to other quarters of the globe.

No. 24, the newest of the Dominion collieries, which was closed down early last December, is in operation again. This mine had just been put into condition to give a good output when depression struck the coal trade. Consequently none of its new equipment was put into motion. A new bank-head, with concrete decks, new tracks and tipples and screening machinery for assorting the coal, with new bank and haulage engines, have been awaiting the turning on of the power. The mine is equipped for an output of twelve hundred tons per day, but usually the calculation of tonnage is exceeded.

Miners Now Hard at Work

Mine labor is less restive and after the Award of two Conciliation Boards, it seems to have fallen into a more moderate mood. This may be due to the re-action after the prolonged efforts of agitators; but we are inclined to think that quiet reflection is settling down over the minds of men who were badly misguided and who are beginning to realize their best friends among the Executive Officers were those who counselled them against hasty action. Anyhow the workmen of Nova Scotia will think twice before again following a line of action that will still further lose them the sympathy and support of the public. The Executive Officers are giving little lead to the rank and file as to how they should vote on the Scott Award, and while it is desirable that the Award should be accepted, yet the greater injury will come to the workmen rather than to the Company from its non-acceptance.

President Baxter Vindicated

The vote on the recall of President Baxter was very small and therefore very disappointing to the Reds and their leaders. The only excuse that can be offered for such vile treatment of a faithful officer was the chagrin felt over the award of the Gillen Board, and the inflammatory speeches made by J. B. McLachlan. Men were "stirred to mutiny and rage". The Board, it was said "had failed to make full investigation", "the Coal Company were tyrannical" and "President Baxtor was a traitor," fit only to be cast out of society. Subjected to the "pelting of the most pitiless storms" of abuse, Bob Baxtor kept steadily on. This was base ingratitude to the men who had in the early days of the U. M. W. lead many a forlorn hope. Even his comrade in war, J. B. McLachlan, seemed anxious to follow the funeral car so long as he had full liberty to fire the funeral pile. Surely "judgment had fled to bruitish beasts and men had lost their reason." But President Baxter has been fully vindicated and to-day he stands higher than ever before in the eyes of the Canadian public, and of those who know him best.

Steel Plant Busy Again

The Sydney Steel Plant has two thousand men employed and rumors are rife that better things are in store for the immediate future. As it is, the number employed is a large addition to that of two months ago.

A number of Bethlehem steel experts and some New York financiers made a thorough inspection of the plants and property of the Empire Steel Corporation in Nova Scotia and elsewhere lately. Whether this means a new bond issue or a merger, is as yet an unanswered question. It is generally hoped that it will bring steady employment to the inactive steel plants of Nova Scotia.

The Ottawa Government was petitioned by the Board of Trade and the Town Council of Sydney Mines, to buy and use more ecoal on the National railways, so that more employment might be given. Whether the Government will take any action in the matter remains to be seen, but at present a searching investigation is being made into the contracts of coal made for these railways during the Spring. The Nova Scotia members of parliament seem to be forcing the matter, and they are quite right.

The Executive Officers of the United Mine Workers have decided to make no recommendation to the members on accepting or rejecting the award of the Scott Conciliation Board. A convention will be held in Truro on the 25th inst., when the matter will be discussed. It may, however, develop that the advice of the Executive may be sought, and some direction to the rank and file may be asked for. In the light of what has already taken place on this vexed question of wages, this may be a very difficult thing to do.

If a two year agreement could be made on present wage rates it might be of great benefit to the industry. With American freight rates falling and miners and operators of the United States in deadly grips over wages with the certainty of wage reductions, no mistake would be made if the men could get the Empire Steel Co. to agree to a contract running over a period of eighteen months at least.

The Southern Rhodesian gold output for April 1922 amounted to 54,318 ounces, as compared with 54,643 ounces for March 1922, and 47, 858 ounces for April 1921.

British Columbia Letter

Premier

Although the Premier Mine, Portland Canal, northern British Columbia, better known in western Canada as the "Wonder Mine", already has paid two dividends aggregating $900,000, another substantial dividend will be announced in the near future.

Mr. R. W. Wood, of the Premier Mining Company, who accompanied Mr. H. A. Guess, vice-president of the American Smelting and Refining Company, in a call upon Hon. Wm. Sloan, Minister of Mines, lately, is responsible for the foregoing statement. He states that the Premier is fully meeting expectations in the course of its development. The new aerial tramways from the Mine to Stewart, B. C., the longest ore haulage installation known, is giving every satisfaction in operation.

The actual management of the Premier Mine is lodged in the A. S. and R. Co., of which Mr. Guess is the active head. This is one of the greatest mining corporations of the American Continent. Mr. Guess has just completed an inspection of the British Columbia property. While he has little to say regarding the results of recent work in the direction of further opening up of the ore bodies, the fact that provision has been, and continues to be made for the plant necessary for development on a large scale is conclusively indicative of the confidence of himself and his associates in the future of the mine.

It was announced that the Premier Mining Co., with a view to the assurance of an adequate supply of ore to maintain shipments on a large scale for an indefinite period, has bonded the Northern Light Group of Mineral Claims. These adjoin the Premier and the work of developing the mineral showings of this property will be proceeded with this season.

The Trites Wood Co. Ltd., the company largely responsible for bringing the riches of the Premier to the notice of the world, has bonded the "Big Missouri." This also is in the Salmon River section of the Portland Canal Division. Sir Donald Mann, of Mackenzie Mann fame, held the property for some years. He did considerable development. It is the intention of the new bond holders to carry on the work started in order to definitely establish production possibilities.

Mr. Guess will next visit Peru where the American Smelting and Refining Company has large mine holdings. Plans have been completed for the installation there of a 22 mile aerial ore haulage system. When this is in operation the Premier Mine's aerial will have to take second place. It is this and other large scale Peruvian mining projects that are taking Mr Guess to South America at the present time.

Silversmith

The Silversmith Mine, Slocan, is now equipped with a flotation plant which is producing a 50 per cent zinc concentrate, containing on an average 35 oz. of silver per ton. About 400 tons of zinc and 500 tons of lead concentrate are being turned out monthly. Under the new zinc schedule announced by the Trail smelter this should net the Company about $23.00 per ton. There had been no market for this concentrate previously and some 5000 tons of zinc concentrate had accumulated from the old gravity milling operations. As soon as the new Trail zinc plant is completed this will be forwarded for treatment.

The Cork Province Mines, Ltd., at a general meeting held recently, authorized the increase of the capital stock of the Company to $150,000. This, it is stated, will provide a working capital of $50,000 after all obligations have been retired.

Ore receipts at the Trail Smelter, Canadian Consolidated Mining and Smelting Co., for the week ending May 31st last aggregated 6,649 tons. Among the independent shippers were the Black Rock, Northport; Ottawa; Quilp; Republic; Roseberry-Surprise, New Denver; Silver Hoard, Ainsworth; Silver Standard, New Hazelton; Surprise, Republic; and Silversmith, Sandon. The total receipts for the week ending May 31st were 12,530. Of this total the Company's mines contributed 12,530 tons, the chief independent contributor being the Silversmith, 367 tons.

The Bayonne group of gold claims is reported to be the scene of a rich strike, exceptional values having been encountered in the course of underground development. The vein was struck 60 ft. ahead of the expected point of contact. It is 2½ ft. wide and is considered of such importance as to have a stimulating effect upon mining throughout the district.

There has been a strike of rich ore in the workings of the Reno mine, Sheep Creek. The vein matter exposed 20 ft. from the surface shows free gold, but whether development will prove this to be only a pocket remains to be seen.

Sullivan Mill

A definite announcement has been made regarding the plans of the Canadian Consolidated Mining and Smelting Co. at Kimberley, it being stated that a concentrator of 1500 ton capacity is to be installed immediately for the handling of the ores of the Sullivan Mine. The cost is estimated to be between $1,250,000 and $1,500,000 and the plant is expected to be ready for operation early in 1923. Construction will be in charge of G. F. Chapman, Mechanical Superintendent of the present Sullivan plant at Trail. The mill will be designed and built by the Company. With the completion of the new concentrator the output of the Sullivan Mine is expected to be greatly improved. There also will be more adequate provision at Trail for treatment of the ores of the Rossland Camp. In connection with its expansion it will be necessary for the West Kootenay Power and Light Co., to arrange for further power development at Bonnington Falls.

George W. Cormack, whose name is associated with the discovery of gold in the Klondike, died a few days ago in Vancouver B. C. It was he, who on August 17th, 1896, found gold on Bonanza Creek, the news of which took thousands of prospectors into the Yukon. Mr. Cormack recently addressed a meeting of the Yukon Pioneers' Association recalling some of the most interesting of his experiences in the Far North.

It is possible that the Dolly Varden Railroad, Alice Arm, will be put into condition for the operation of hand cars this summer. This would be only for the convenience of mine operators and prospectors. The Public Works Department of the Provincial Government has been inspecting the road to ascertain the cost of the work necessary.

Granby's Annual Report

The Granby Consolidated Mining and Smelting Power Co. has just issued its Annual Report in which it is stated that after writing off $100,000 for depreciation there was

a net operating deficit of $287,161.64. This deficit would have been far greater but for the splendid team work on the part of the mining and metallurgical staff and the employees; team work that reduced the cost of copper production from 15.94 cents in 1920 to 11.65 cents per pound in 1921, which is equal to a reduction of 27 per cent. The average price obtained for copper was 12.76 cents per pound, compared with 17.85 cents in 1920, and it was this great difference in the selling price that was responsible for the deficit.

The company smelted in its furnaces, 913,008 tons of ore, of which 16,206 tons was custom ore, and produced 29,970,651 pounds of copper, 193,283 ounces of silver, and 8,858 ounces of gold. This production compares favorably with 25,744,327 pounds of copper, 1,054,206 ounces of silver, and 9,481 ounches of gold produced in 1920, when it is remembered that three-quarters of the silver production in that year came from the Dolly Varden mine. The decrease in gold production last year is accounted for by the fact that barren quartz was used for fluxing purposes, instead of very low grade gold quartz.

Owing to metallurgical improvements that were made in the smelting practice, less coke was required, and the coke-oven plant was operated at only 43 per cent. of its capacity. From 89,543 tons of coal charged into the ovens, 56,021 tons of coke, 2,193,555 pounds of ammonium sulphate, 188,001 gallons of motor fuel, 661,046 gallons of tar, and 137,000,000 cubic feet of gas were produced.

The Company's colliery, at Cassidy on Vancouver Island, produced 215,211 tons of marketable coal. Of this 89,529 tons was used by the company at its colliery and smelter and 125,686 tons was sold, the principal market being in Seattle.

Besides the new storage dam, which already is well under way, and which when complete the directors estimate will bring about an annual saving of from $150,000 to $200,000 in fuel oil, the directors recommend the erection of a concentrating plant of 1000 tons daily capacity at Anyox, to treat a large reserve of silicious ore that cannot profitably be smelted directly. It is likely that work will be commenced on the erection of this plant before the end of the year. It is emphasized that considerable economy will be effected by mining the two classes of ore at one time and treating them separately, instead of leaving the low grade ore in the mine and returning to recover it later.

Although an inroad to the extent of 224,893 tons has been made on the ore reserve, there still is a reserve of 10,751,527 tons of ore averaging 2.24 per cent. of copper, and new high-grade ore has been discovered by diamond drilling during the year. A considerable body of massive sulphide ore, running about 0.5 per cent. of copper, but running very high in sulphur and iron, has been found, and though this has no commercial value at the present time, it may become valuable for the manufacture of sulphuric acid, should a demand occur for a large quantity of that substance.

With a further decrease in operating expenses through the erection of the new reservoir and with a general stimulation of the copper market, which is shown by the sharp upward movement in all copper mining shares, there is every indication that the company will have a far better year to record in its next annual report.

Injunction in Cedar Creek Placer Claim

Mr. Justice Morrison of the Supreme Court of British Columbia has enjoined Alfred Platt, original staker of Cedar Creek from committing a tresspass upon the property of Edward G. Stevens, known as placer mining lease No. 180. It seems that the claims belonging to Messrs. Platt and Stevens adjoin and it is stated that Platt's stakes do not cover the ground in which he first found gold. The matter is of importance because at the point in question there has been an output recently of from 4 to 12 ozs. of gold daily.

No More Foreign Coal for B. C.

The practise of the importation of foreign coal by vessels of the Canadian Government Merchant Marine operating on the Pacific has been protested by the Honourable Wm. Sloan, Minister of Mines, with good effect. The matter was taken up both with the Honourable W. C. Kennedy, Minister of Railways and Canals, and the Right Honourable W. L. Mackenzie King, Premier, it being pointed out that Canadian ships were bringing to British Columbia on their return voyages from Japan, Australia, and other outside ports sufficient fuel to meet the bulk of the requirements of the fleet. This, it was argued, had a tendency to discourage the production of the provincial coal field and was particularly reprehensible having in view the present weakness of the bunker and domestic trade. A continuance would have the effect, it was pointed out, of increasing local unemployment when all endeavours should be in the opposite direction. On this question Hon. Mr. King made a statement in the House of Commons, Ottawa, denying that it was the intention of the Government to buy Japanese coal for use on the Pacific and that the coal already purchased there has been used as ballast because it was cheaper to do this than to secure other material for that purpose. He asserted that as far as possible it was the policy to use only British Columbia coal on Government ships operating on the Pacific.

The Coal Mines

In the Crow's Nest Pass field the strike is still under way and there is no prospect of an early settlement. If anything the employers and employees are further than ever apart. The output from this district for the past month therefore has been negligible. On Vancouver Island lack of demand has enabled the mines to work only part time. Following are the Vancouver Island production returns for the month of May:

Mine	*Tons.*L
Western Fuel Corporation of Canada, Nanaimo	35,840
Canadian Collieries (D) Ltd.,	
Comox	26,299
Extension	16,229
South Wellington	6,193
Granby Consolidated, Cassidy	19,458
Nanoose Wellington Collieries, Wellington.	4,860
Old Wellington Colliery, Nanaimo	574
TOTAL	109,453

The semi-official China Year Book for 1921-1922 gives the latest available statistics of coal and metal production. Gold production for the year 1916 amounted to 108,000 tacts (a tact is the equivalent of one and one-third ounces avoirdupois), most of which was derived from alluvial workings 73 per cent. of the workings are , or were, under Government control. Antimony outputs came to 10,000 tons. No reliable statistics are obtainable for zinc, lead, copper or silver. There are large possibilities for expansion in the production of all these metals. The coal production of 1920 was 19,500,000 tons, of which about half came from mines controlled wholly or in part by foreign capital. This is an increase of 20 per cent. over the year 1916.

Northern Ontario Letter

Crown Reserve at Larder Lake

The work of developing the property of the Crown Reserve Mining Company at Pancake Lake in the Larder Lake district is now well under way, and the work of the next six months will probably determine the approximate outcome of the venture.

Surface showings were encouraging, although not such as would assure success. The results of diamond drilling operations, however, were favorable and encouraged the management to go ahead in the hope that the property would develop into a paying mine. Accordingly, the property has been equipped with a mining plant and the work at hand will consist of 300 feet of shaft, three compartment in size, in addition to a large amount of lateral work.

The deposit does not lie in that part of the Larder Lake field where the Canadian Associated Goldfields spent about a million dollars in a futile effort but is on the easterly continuation of the rock formations, which are commonly referred to as the "Kirkland Lake series". Success here would point the way to several miles in length of important mineral lands beyond the point already proven in the Kirkland Lake field.

McIntyre Mill

Within the next few days the additional milling equipment on the McIntyre-Porcupine will go into operation and will enable the company to handle from 750 to 800 tons of ore daily, as compared with 550 tons daily heretofore. Not only this, but it will mark the commencement of the treatment of carbonaceous ore which the additional equipment is especially designed to handle. Some of this ore is high-grade, some of it running from $20 to $100 per ton.

Wright-Hargreaves Dividend

Official advice to the Journal from Edwin Lang Miller, vice-president and secretary of the Wright Hargreaves Mines, Ltd., that the company would pay a 2½ p.c. dividend on July 1st to stockholders of June 17th did not come as a surprise to close observers of this enterprise.

It has come to be recognized that although the company has not gone on a regular dividend basis, yet the physical condition of the mine and the high efficiency obtaining in the mill combine to assure regular disbursements at intervals of every three months. The mill first went into operation a little over thirteen months ago and already the company has paid $275,000 or 10 p.c. to its stockholders, including the dividend just now announced.

In the meantime, an exceptionally rich strike has just been made on the Wright Hargreaves, in a stope in the east drift at a depth of 400 feet. This drift has been yielding good ore during the course of development work, but all former ore in the mine has now been surpassed in richness by the shoot encountered at this point. Not only is native gold apparent in spectacular quantities, but gold tellurides are present to a important degree. Some of the ore will assay hundreds of dollars per ton, and is quite typical of that found in sections of the adjoining Lake Shore mine.

During the month of May the mill continued to operate at an average of close to 200 tons of ore daily, with mining and milling costs held down to a level that assures a wide margin of profit.

Kirkland Lake Production

Figures secured from the Ontario Department of Mines with regard to the gold production from the mines of the Kirkland Lake district for the first quarter of the current year show five mines equipped with mills, having an aggregate capacity for handling 770 tons of ore daily. The figures show the Ontario Kirkland as having a capacity of 200 tons daily, but this is an error, as the plant was designed to treat 100 tons a day. Therefore, the correction shows that the mines of this field are equipped to handle 670 tons of ore daily.

These mines produced an aggregate of $349,742 in the three months, made up of $348,031 in gold and $1,711 in silver. A feature of the silver production was that $742, or nearly 50 p.c. of the total came from the Wright-Hargreaves.

The one disappointment in the entire field was the fiasco at the Ontario-Kirkland, where the impression had been sent broadcast that the ore would average upwards of $10 per ton, but where actual achievement showed 5,300 tons treated and $9,558 as the pitiful result; that is to say, $1.79 a ton.

However, taking the other mines, namely, Wright Hargreaves, Lake Shore, Teck-Hughes, and Kirkland Lake, the result was extremely good, the ore in the aggregate averaging $12.15 a ton, in spite of the grade being quite low at the Kirkland Lake Mining Company's property.

In the following summary, it will be noted that the Teck Hughes made a remarkably favorable showing and is running the Lake Shore a close race for second place in this field:

Company	Gold	Silver
Wright Hargreaves	$197,471	$742
Lake Shore	152,931	363
Teck Hughes	138,191	337
Kirkland Lake	49,260	186
Ontario Kirkland	9,175	83

It will be noted that the Tough Oakes mill of the Kirkland Lake Proprietary is not included in the list, as this plant, good for 120 tons a day, only went into operation during the second quarter.

Crocsus

The Dominion Reduction Company is considering the question of interesting itself in the Crocsus mine in Munro township. The workings of the mine are being dewatered preparatory to making an examination.

Surface showings were extremely rich, but subsequent work showed the gold to occur in small patches and the operation proved to be a disappointment, thereby leading to curtailment of work some years ago. The present examination will hinge a great deal on a study of the geology and the possibility of working out the serious problem caused by faulting of the formation.

Dome Lake—West Dome

At last it would appear as though the long discussed consolidation of the Dome Lake Mining and Milling Company with the West Dome Consolidated, will be brought about. A meeting of the stockholders of the West Dome Consolidated was held on June 16th, and approval of a plan to merge with the Dome Lake into what is to be known as the Consolidated West Dome Mines.

The new company is to have an authorized capital of $5,000,000, made up of 5,000,000 shares of the par value of $1 each. The West Dome is to be given 1,400,000

shares while an equal number will go to the Dome Lake shareholders, thereby leaving 2,000,000 shares in the treasury with which to raise the money necessary to carry on additional development work and re-open the mill already installed on the Dome Lake.

It has been intimated that there are certain legal aspects to the proposition that may further hold up the consolidation plans, but whether this is correct or not will probably be determined today.

Cobalt Refinery at Niagara Falls

Considerable interest is taken here in the report that the Coniagas Reduction Company may be amalgamated with the Electric Gas Bleaching Company of Niagara Falls. The Coniagas plant, which is at Thorold, was erected originally for the purpose of treating Cobalt ores, but the enterprise met with serious difficulties both in connection with its process being expensive and finally in a collapse of the market for cobalt products. As a result of this, a considerable quantity of cobalt residue and speiss is on hand, while additional residue is accumulating from the ores that are being treated from the Coniagas mine.

The Electric Gas Bleaching Company is said to have an inexpensive process and it is this process that the company has to trade as against the supplies of raw material held by the Reduction Company. It is said that in addition to cobalt metal and oxides, caustic soda, chlorine gas, and liquid chlorine will be produced.

O'Brien Only Shipper

During the week ended June 9th, the O'Brien Mine was the only company appearing on the list as having shipped ore over the T. & N. O. Railway, this company sending out one car containing approximately 64,000 pds.

Development in South Lorrain

Good progress is being made by the Mining Corporation of Canada in the work of opening up its newly acquired properties in the South Lorrain silver area. The crosscut from the prospect shaft at a depth of 300 feet has reached the continuation of Wood's vein from the adjoining Keeley, and drifting is under way.

More importance attaches to the operation than is generally recognized. Not only does the Mining Corporation hold the Haileybury Frontier, but it has also secured the Haileybury Silver, Forneri and Crompton properties. Success in a like degree as has been met with on the Keeley Silver Mines would add largely to the chief assets of the Mining Corporation.

Keeley Production

Production of silver from the Keeley Silver Mines in South Lorrain has been averaging about 50,000 ounces monthly, and arrangements are now completed whereby it is expected the output will be increased.

The mine commenced production toward the end of the first half of 1921 and had a production record of about 313,000 ounces by the end of the year. Since the beginning of 1922, the production has averaged close to 50,000 ounces monthly and was not far under a total of 250,000 ounces for the first five months of this year, thereby establishing a record of between 550,000 and 600,000 ounces of silver during the first full year of operation. During the month of May, the mill handled an average of approximately 85 tons of ore daily, and this will be followed by a larger average during June.

By reason of the Keeley having been looked upon as a doubtful proposition, and passed up for a number of years by the experienced miners of the nearby Cobalt field, the success now being achieved by Major J. Mackintosh Bell for his Old Country principals is all the more interesting. Not only is the mine on a producing basis almost equal to the leaders in the Cobalt field, with the exception of the Nipissing, but a large ore reserve has been placed in sight. By reason of this favourable physical condition of the mine, which has been brought about by the fact that very little stoping has so far been done, it will be reasonable for the Keeley to produce on a basis at least equal to the current output of the O'Brien, Coniagas or Mining Corporation.

The shaft on the Keeley has been extended to a new deep level. It is too early to estimate the importance of the veins at this horizon, although in the limited amount of work so far done the "pre-glacial" oxidation which pointed the way to the heavy silver deposits at the preceding levels is now in evidence at the deepest level so far opened up. Lateral work is proceeding at this point and the ultimate result is a matter of great importance to the enterprise.

Castle Trethewey to make Large Shipment

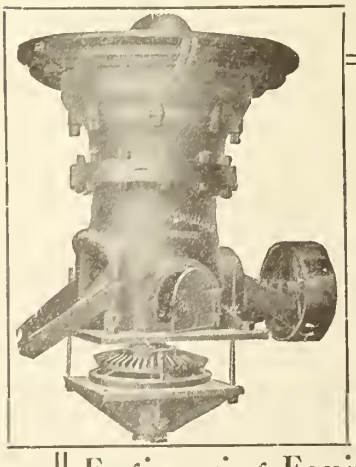
Arrangements are being made at the Castle-Trethewey property to make a quite impressive shipment of high-grade ore. The consignment will probably be the largest so far sent out from that property and will be the product of several months' work.

From a vein about three inches in width, the richer parts have been hand-picked and the shipment will run high. In addition to this, a substantial quantity of medium-grade ore has been either taken out or placed in sight, pending the erection of a small mill on the property. As regards such a mill, the power situation in the Gowganda district is unsatisfactory, the only hydro-electric plant being owned and operated by the Miller Lake-O'Brien, with no more energy than is required by that company itself. This tends to surround the question of a mill on the Castle-Trethewey with uncertainty for the time being at least.

To operate with coal is very expensive, particularly at a distance of between 25 and 30 miles from the railway. Indeed the Miller Lake-O'Brien, even with electric energy, finds it necessary to treat only such ore as contains from 25 ounces of silver per ton and upwards. The solution for the power situation as it applies to the Castle-Trethewey appears to lie in the work now under way at Indian Chutes on the Montreal River where it is planned to develop about 3,000 h.p. A power line some 20 miles or more in length would convey this energy to the Gowganda district.

Regular Nipissing Dividend

The Nipissing Mining Company has declared a regular quarterly dividend of 3 p.c., payable July 20th to stockholders of record June 30th. The financial statement shows liquid assets of $4,510,129.20.



Chalmers & Williams

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Engineering Equipment Co., Limited

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EDITORIAL

So then, in the buying of shares, as in other matters, there should be a certain limit of expenditure which miners should set themselves, lest, blinded by the desire for excessive wealth, they throw all their money away.—Georgius Agricola—1550— (from Hoover's translation.)

UNFINISHED PRODUCTS

In the metallurgical industries the term "finished product" is loosely used. We may take it to mean that, although smelter and refinery products may require further manufacture before they enter the markets of the world, they have been brought to the final stage so far as the prime producing establishments are concerned. For instance, concentrate, matte, impure bullion, or refined metal may be shipped and sold by a mining and smelting company. Only the refined metal, however, represents the "finished product".

There is something of an analogy here between the production of metals and the output of our universities. We fear that our institutions of learning are not yet giving us the properly finished articles. The substitute is often attractive, but it does not serve the purpose it is supposed to serve. It is very apt to have its value diminished by "segregations," "slag inclusions and adhesions" and so on.

To be specific, there is not much evidence that our technical graduates are better fitted today to cope with the world, the flesh, and the devil, than they were twenty years ago. Today it is as true as it was a generation ago that a fairly bright young office man, without college training, has a vastly greater chance of becoming the general manager or president of a large mining or smelting company than has the technical graduate.

In part the "segregations" and "slag adhesions" mentioned above, impede the graduate's progress. He leaves college with pre-conceived ideas that it may take years of hard knocks to correct. In the three or four years of his college course he is taught nothing at all that touches directly on the making and handling of money. Even the marketing of mineral products is totally neglected. The results speak for themselves in no uncertain way. Unemployment or constant change of employment, no hope of a competency unless he permit the promoter to misuse him, these are the guerdon of the mining engineer. And yet our colleges continue cheerily to turn loose increasing numbers of mining graduates, to wander in the parched and perilous pastures of the business world!

NEWSPAPERS AND MINING NEWS

One of the most convincing evidences of the spread of genuine education on this continent is the expanding market for good literature. "Best sellers" and "yellow" journals still seem to hold the field, as ever; but those able to speak with knowledge assure us that the appreciation of wholesome, well-written English is growing faster than our population.

The most influential of all mediums whereby the written word is presented to modern civilized man is the daily newspaper. One of the signs of the times is that there are now on this continent at least two prominent daily newspapers that have declared flatly for a high ideal, and are consistently living up to their resolve. The New York "Times" and the Chicago "Tribune" are now, in that regard, on a par with the best newspapers in Europe. That their efforts toward improvement are appreciated far and wide throughout the continent is shown by their circulation. Both papers are now widely read throughout Canada, as well as in the United States; and either can be had conveniently in London and other British centres.

One of the most obvious defects in the ordinary newspaper is its inclusion of statements that, even to the ill-informed, are incredible and ridiculous. Moreover, a large fraction of its columns appears thus to a man who is well informed. There are those among its readers, of course, whose gullibility renders them capable of believing the nonsense they read, but such ones are surely hardly worth catering to. It can be fairly stated that the average intelligent reader is sceptical of whatever modicum of truth his daily paper presents to him, on account of the obvious untruth that he discovers intermixed. The reader who discerns the improbability of a man's making his escape from an enraged panther by means of climbing a tree (as was recently reported throughout the continent) is not likely to believe the next item, which may be a perfectly true account of the wonders of the Hollinger mine or of the Trail smelter.

Mining news is particularly susceptible to false statement or to exaggeration. Certainly the public and the staff of the central news agencies are too ignorant of the elements of mining knowledge to use much discri-

mation in what they print, read, or believe. To cope with the situation, it is necessary for those newspapers that wish to rise above the ruck, to add to their staffs men with special knowledge. Even the central news agencies, such as the Canadian Associated Press, lack this simple means of ensuring that they propagate the truth throughout the land in lieu of falsehood.

It is a curious fact that in this respect many a great city daily places itself on a par with the struggling small-town paper. One may read in both, the same account of the fabulous riches in gold to be got from the bottom of the Fraser River, enough to pay off the whole debt of the Imperial Government! Surely there are among our leading Canadian newspapers one or two whose self-respect places them above complaisance when such stuff gets into their pages. We hope it is so, and that in these years following the war, when quality is commencing once more to asserts its superiority over mere quantity, mining news, along with other specialized information, may be presented in our daily press in such a way that the specialists need not smile.

MINES AND MANUFACTURERS

It has recently been announced that the Johns-Manville Company has taken over the Bennett-Martin asbestos properties in the Thetford district, Quebec. These properties consist of the long-established pit and mill at Thetford Mines, in the centre of the producing area, and the Vimy Ridge quarry and mill, recently opened up on the southwestern border of the field as well as a large area of undeveloped property.

For years past the Johns-Manville Company (one of those long-established and substantial concerns, organized and managed by family rather than corporate interests, and hence more characteristic of Britain than of this continent) has owned and operated a quarry at Asbestos, Quebec. Here there was produced only those short fibres whose chief use is in insulating coverings, or as a binder in fire-proof paper or cement products. The Vimy Ridge property produces fibres of greater length and flexibility, while the Martin-Bennett pit in Thetford produces the usual quota of "crude", as well as mill fibre. Thus the Johns-Manville Company has now provided for the independent production of all the grades of fibre it requires in its manufacturing establishments, and likewise for a sufficient annual tonnage to meet its needs.

This acquisition of the sources of its principal raw material by a company whose main concern is manufacturing and marketing, is a tendency that is becoming increasingly evident on this continent. Particularly is this so in the asbestos field of Quebec. The independent producer of raw asbestos has had rather a thin time of it during the recent industrial depression. His whole capital has been tied up in the production of raw material. During the boom, manufacturers carried an overstock of raw material, which they have since been gradually working off. Their operations were curtailed; but those of the asbestos mines providing material for these factories, had meantime ceased. On the other hand, the factories that were provided with a sure supply of asbestos from their own mines, even during boom times, did not find it expedient to carry an unusually large stock. Consequently, the recent curtailment of manufacturing activities meant for them only a corresponding reduction in mining operations.

The tendency toward the consolidation of mining and manufacturing interests is sound. A diversity of products is one of the best of assurances against the vicissitudes of trade. Few mines can provide this diversity, while it is characteristic of a manufacturing establishment. Hence we may look for the repetition, a number of times, of the move that has just taken place.

THE APPEAL OF A NEW REPUBLIC

There is now established in Washington a mission or delegation from the Far Eastern Republic, whose concern is, evidently, to promote such intercourse with the people of this continent as will be to the benefit of both, and, particularly, will result in the commercial development and consequent prosperity and stability of the new republic. A series of pamphlets, compiled under the direction of this delegation, has recently been issued. They describe the mineral resources of this trans-Pacific land.

We must confess to having been, for a time, completely mystified as to the identity of this new Republic. A map at the end of one of the pamphlets solved the riddle. The Far Eastern Republic is a fragment of the late Russian Empire, with Vladivostock as its capital. Its coastline extends northward from Vladivostock for about 1,500 miles. To the north is the Siberian territory of the Russian Soviet Republic, and to the south, Manchuria and Mongolia, in the Chinese Republic.

The mineral resources of this vast territory are evidently known only in the vaguest way. Some mining development took place under the paternal direction of the Czars, in whom the mineral rights were vested, and who exercised this right through the agency of convict labour. Of that rational and consistent development due to the exercise of individual initiative, upon which the human race's progress mainly depends, there has been little or none.

The emissaries of the new Republic now invite the co-operation of the plutocrats and technologists of the American continent in opening up their land to the influences of civilization. For the first time in history, America attracts the attention of such delegates, rather than Europe. America is not yet accustomed to the new rôle, and the response is likely to be hesitating, and somewhat awkward. But the beginning of such a movement has been made in China, where engineers of the United States are directing the initiation and operation of a number of Manchurian undertakings; and its logical growth will naturally include the territory of the Far Eastern Republic.

Canada is in a totally different case from her southern neighbor. While the world's surplus wealth is now concentrated in large degree within the borders of the United States, Canada's heritage from the war has been mainly a debt of staggering proportions. Unlike Britain, we had no reserve of accumulated wealth upon which to draw in the time of need. Our wealth is in our fields, forests and mines, and these are the banks upon which we must draw to meet our obligations. So far as our assets go, we are in much the same case as the Far Eastern Republic. We need capital to develop our natural resources. Fortunately we have the men, trained as well as unskilled, whom we can thus employ once the necessary capital is found. Thus it is more with a fellow-feeling that we Canadians look upon this appeal of the Far Eastern Republic for a share of that accumulation of wealth by means of which a rapid development of natural resources is alone possible. We trust, however, that the stability of Canada's government will provide an incentive to foreign investors more powerful than that which might attract them to the next-door neighbor of the Soviet Republic.

LABOUR, LAW AND ORDER

Murders, comparable in their bestial wantonness to the Irish assassinations, have occurred in the coal fields of southern Illinois. These are not the first that have been committed during the continuance of the present wide-spread strike, nor are they the last that will be perpetrated. The agitators who precipitated the strike can no more escape the awful onus of blood-guilt, than can the deposed Kaiser and his advisers. The labour-union leaders must have known all too well, what it means to throw more than half a million men out of employment. No strike of this kind in the United States has ever been unaccompanied by bloodshed.

The peculiarly atrocious character of the Illinois murders, as reported in the daily press, is appalling. That, in this country and in a Christian country, men can fall so desperately low, is a grave indictment of the whole body politic.

Canadians, keeping in mind the all too recent incidents of the Winnipeg *émeute*, cannot lift up their hands in holy horror.

The world should be told the unvarnished truth about the labour agitator.

EDITORIAL NOTES

The mining fraternity will welcome the announcement of Hon. Charles Stewart, Minister of Mines at Ottawa, that active measures have been taken to foster an overseas export trade in Canadian mineral products. By this means, more than by any other, will Canada's burden of debt be reduced and eventually removed, and our country enjoy the smiling prosperity that is our natural inheritance. In Dr. Charles Camsell, Deputy Minister of Mines, Canada has an emissary not only eminently qualified by his personal attributes to represent our country, but personally conversant to an unusual degree with the mineral resources that will be discussed. His eminence in geology is marked by the bestowal upon him this year of the Murchison grant.

The Imperial Mineral Resources Bureau, which is coming more and more before the public notice, is an institution the importance of which to Canada is as yet not at all fully realized. It has been formed for the purpose of developing a self-sufficient inter-Imperial mineral trade, and its express intention is to have this development done, as far as possible, by means of British capital. Though the war made tremendous inroads upon the accumulated wealth of the motherland, still there is ample remaining for the purpose contemplated, provided it is applied judiciously. We look forward with interest to the reports of Dr. W. G. Miller on his return from the Bureau's latest conference.

We learn that Eastern Canadian mining capitalists have taken over the well-known Engineer Mine in Northern British Columbia, now happily clear of the courts and subject to active operation once more. It is satisfactory to note that Canadian capital is to be thus identified with the mineral development of the Pacific province—a field left largely to American capital of late. The Engineer Mine has produced some phenomenally rich ore, but its continuity and average grade have still to be proved.

PROMOTERS

Pray tell me briefly, if I may
Be so bold as to ask,
If ever for a month or day
Promoting's been your task

Promoters come, promoters go,
But mostly, soon or late,
They leave a load of waste and woe,
A heritage of hate.

And yet, and yet, they're not to blame
A wee bit more than those
Who take a chance, and are not game
To stand the chance they chose.

The moral's obviously seen:—
Promoters will exist
Until promotees grow less green,
So why complain— oh! whisht!

ANON

A Budget from New York

By KIRBY THOMAS

An Early Canadian Record

In the miscellaneous papers in the mining alcoves of the New York Public Library is an interesting early-day record relating to a Canadian operation which after several business vicissitudes is again receiving serious attention — namely, the unique gold placer gravels in the vicinity of Beauceville, Quebec. The author of the prospectus of the "De Lery Gold Mining Company", issued in 1866, was either an amateur or was over-conscientious. The opening paragraphs of this appeal set forth that "The business of mining the precious metals is confessedly one of great risks. All prudent men regard its allurements with suspicion. None but the bold will fearlessly venture money in a direct search for gold and silver. The history of Mexico and the Pacific Coast furnishes abundant proof that these apprehensions are well founded." After the alarums the writer proceeds to offer the "guaranteed stock" of the company, "capital $1,000,000, guaranteed stock, $500,000. It would be interesting to know how the stock was "guaranteed", but this information was not vouchsafed. The company was formed to operate the gold placers in the Seigneury Pigand Vaudreuil, on the Chaudiere river, in Quebec. It is blandly asserted that "merely initial exploration has revealed some forty miles of gold-bearing quartz ledges". Surely this fact should have been sufficient without the "guarantee". The company's office was at 72 Cedar Street, New York.

Sources and Uses of Feldspar

The resumption of activities in the American plants engaged in the production of clay products in the form of pottery, crockery, sanitary enamel-ware and surfaced tile for building, has led to increased demand for feldspar, which is used as a flux in the glaze. This increased demand is being supplied in large part from Ontario and Quebec, where a number of old mines have been re-opened and new ones developed recently. The Canadian product, which is imported without duty, is in competition with the domestic supply, which now comes largely from the southern Appalachian region. The chief consuming centres for the product are in the Ohio valley district, and therefore the imported feldspar has about an even break as to freight rates with the domestic product. Many of the Canadian properties are American owned and operated.

There is increased activity in the demand and development for feldspar properties in the South, particularly in the Carolina region accessible to cheap railroad transport to northern points. A part of the supply for eastern plants comes from New York state and Maine. The quoted prices of crude feldspar range from $8 to $18 per gross ton at points of production f. o. b., depending upon the grade and quality, particularly the potash content of the product. Most of the Canadian product is imported crude, but the domestic production is quite largely ground at the mines and brings a correspondingly higher price.

The attempts to utilize feldspar as a source of potash which were made during the war when potash was at a high price, owing to the exclusion of the German supply, have quite generally been abandoned, having been a failure from a commercial standpoint. This has left the chief market for feldspar, as before the war, in the field of accessories to the varied clay operations, and as flux. Some feldspar is used in glass making. There are no imports of this material regularly from other countries than Canada.

Migrant Diamonds from Canada

Many years ago, a small boy, playing in a newly dug gravel pit on the edge of a village in southern Wisconsin, gathered, as boys will, a big pocketful of bright and colored pebbles. One of these, more transparent than the others, his mother jokingly told him was a diamond. Taking her at her word, the boy went straight to the village jeweller, a former gem cutter in Holland, who told him that he had found a real diamond and that it was worth $600. Since this incident, many boys and some few men have searched the gravel banks and beds, which are spread over a wide area south and west of Lake Michigan like a rumpled blanket. As a result, more than eighty diamonds have been found, some of them worth several hundred dollars apiece. For the most part they are small, but of a pure quality.

An inquisitive professor in the University of Wisconsin several years ago undertook an investigation concerning these diamonds. After a time he came to the disappointing, though interesting conclusion that these widely scattered gem stones were not native to the Lake Michigan locality but had been brought there by the glaciers, which had moved rough-shod from the northeast many thousands of years ago, bringing a great burden of smooth and worn boulders, of rounded pebbles, and of sand. He suggested that the diamonds had been torn from some natural deposit, perhaps in distant Labrador, by the lobe of the great glacier sheet, which had extended into the Lake Michigan locality where the diamonds were found. Recently, the Canadian geologists have found some real, but very small diamonds, in a solid rock formation near the gold camp of Porcupine in northern Ontario. This formation is in the path of the Lake Michigan glacial lobe and it may have been the source of the diamonds found far distant from it in the Michigan gravels.

The National Research Council, Washington, has rendered yet another service to the technical public. It has just published a new edition of its pamphlet, "American Research Chemicals", in which are given thirty pages of chemicals used in laboratories, particularly research laboratories, and a list of eighty manufacturers in the United States from whom various specified chemicals can be obtained. As a large fraction of Canada's supply of pure chemicals comes from the United States, this bulletin (No. 35, May, 1922) will interest many researchers and laboratory workers here.

A Mining Man of Two and a Half Centuries Ago.

III. THE GLOSSARY.

To elucidate the difficult phrases and passages in Erckern, Sir John Pettus compiled a glossary, or as he elegantly terms it: "*Essays in Metallick Words, as a Dictionary to many pleasing Discourses.*"

Before plunging *in medias res*, Sir John apologizes to the reader for sundry sins of omission and of commission committed by his printer: "The Reader is desired to amend or connive at the Omissions of the *folios* of the first 80 pages... want of *points*, or *vowels*, or *consonants*, or misplacing of Capital Words, wherein I hope the *Reader* will pardon the *Printer*, considering my circumstances." Indeed it would be churlish not to forgive the good knight. He was behind prison bars.

The glossary opens with a short exposition of the word "alchimie." Pettus remarks that sometimes the word is "writ *Orchimia*, which may well have relation to our word Ore or Oar." A shocking bad guess, Sir John! "The Lord Verulam tells us" continues our precious author, "'Tis an Art of Distilling or Drawing Quintessences out of Metals by Fire, setting at liberty such Bodies of Metals as are bound and imprisoned, and bringing to perfection such as are unripe... Fire, in this Definition, seems only to relate to Culinary Fires: But I apprehend this Art looks higher, even to the use of Celestial Fires; from the Sun and Stars, and their influential Heats." Here we have, in tabloid form, the *credo* of the mediaeval scientist.

In proceeding to tell what are the functions of the Alchimist or Chimist, or Assayer or Extracter of Quintessences, Pettus draws up for us a scheme, or flow-sheet, of a mining and metallurgical establishment of his time. First comes the miner, "he that finds out and digs (or causes to be dig'd) the Metallick Oar out of such mines. The second is the Washer, or he that washeth the Oars from their useless Excrements or adherences. The third is the Stamper, that knows how to beat or stamp them by mills or otherwise into such particles as that they may be fitted for smelting Ovens (which are the great melting Works, but called Smelting for distinction from the lesser.) The fourth is the Smelter of the great Quantities in those great Ovens or Furnaces. The Fifth is the finer that smelts them over again, and separates the metals in the great Works. The sixth is the Refiner, that melts them again, so often as he thinks fit... to their several perfections and intireness. The seventh is the Prover or Assayer, who by Tests, Crucibles, Weights and other Experiments is able to judge by all Oars, either as they come from their Veins or made into melted, fined or refined Metals." This leads Pettus into a recondite dissertation upon the origin of Lazarus Erckern's name, in which he quite loses sight of the matter in hand. However, he adverts to his theme before he finishes and delivers a shrewd buffet to such "Alchimists" (not *bona fide* "Chimists") as believed in the transmutation of metals. "By woful Experience of some mens credulity, instead of turning everything into Gold, they have turned all their Gold into nothing."

Here are two definitions of laboratory staples: "Aqua fortis... is a composition of Nitre and Vitriol, etc., and this liquor is used for dissolving and separating Gold and Silver, and hath many other excellent properties."

"Aqua regis is a water made of Aqua fort, and other compositions" [a little hazy, this!] "... it will touch only gold and not silver."

The current knowledge of metals other than gold and silver, is well indicated by the following:—

"Antimony, Speiz and Speiz-glass, is also called by some Mineralists Red Lion, Wolf, and Proteus... It is a heavy, bright Oar, like Lead, but more Speizy, and porous... and the extracts made out of it are of singular Virtues, of which his late Highness Prince Ruperts red drops were chimically made, and given with good success for most Diseases."

The efficacy of bacon derived from a boar as compared with that derived from a sow, in improving gold, is very solemnly debated. Pettus favours the boar, "because" says he "I know it is as effectual in curing of wounds at distance, as the so admired... Weaponsalve; and since it hath such a kindness to metals" he knows not why it should not be used instead of imported articles.

The description of the assayer's balance is a masterpiece of evasion. "The ballance" has "two little Vessels to contain the things to be tried"... "and the tongue of this Ballance... by standing in an equipoisure or not, doth as it were speak or tell you the difference or certainty of the Weights." "The tongue is called *trutina* and from this we borrow the word Truth" [which we don't].

All of us remember the word "blick", describing the play of iridescence over the silver assay bead. Pettus renders it "Blink" and says that "it is commonly used to describe those that are blear Ey'd, or often twinkle with their Eyes; it is also applied to dead and sharp Beer... but in our Author only applyed to bright Oars, or melted Metals".

The vulgar error of confounding brass and copper is corrected at great length. Pettus feels safer on this ground. But he is at his best when a moral of any kind can be extracted. In discussing "calcination" he remarks that "metals seem to be dead in their Oars, but by this calcination revived, to hint to us the advantages of our Resurrection, by the general Conflagration".

Quartz crystals are thus touched on: "Christal...is the purest Earth dissolved by water, and for want of Water, congeal'd to the Christal-Stone."

Chemistry is rightfully placed upon a lofty pedestal "In the best and truest Sence, by the addition of Al l., [to the word "chimistry," thus getting "alchimistry"], we are to understand, That Chymistry doth comprehend All Sciences and Mechanical Arts and Trades, even from the Coblers Awl to the Astronomers Astrolabe, for nothing can be performed without some Metallick Instrument."

"Declination", we learn, "is almost the same with Precipitation... and in a Vulgar sence, a man is said to decline in his Fortune, when he falls from Prosperity to Adversity but in the Metallick sence, it is to fall from the top to the bottom, by which means the Metal is better than when it was at the top; and 'tis often seen that adversity, makes Men better and of more use (as Metals are) by being Cast down." Having read this definition we were curious to discover what Pettus would write of "precipitation". This is what we found: "The general way [of the precipitation] of Metals is first to dissolve them in Aqua Fort, or Aqua Regis, or Spirit of Nitre, or Vitriol, and then they may be precipitated with Sea water and Alcalious Lixiviums". By the last is meant alkaline solutions.

Pettus is an inveterate moralizer. "Dissolving, that is, a metal easy to be loosed from such other metals as are fixt or intermixed, and thence Death is called a Dissolu

tion, when the Soul is loosened from its Terrestral part, and becomes a Coelestial Metal."

"Flame" is the "Oyly part of Wood, or combustibles, impregnated by fire, for the more easy passing it self into all the porous parts of Metals."

Because "Norfolk Flints are full of Ignitous matter", Pettus hints that some wealthy persons should try them for metals, "and then the great Labour and Expence of digging in Mines might be saved." Quite as rational this is, as many a project financed today.

For descriptions of several important implements we are referred to "Utensils." But here, on finding the reference, Pettus calmly refers us back to the text of Erckern, where we can get little satisfaction.

As quicksilver is called "Mater," the mother of metals, so gold is called "Pater Metallorum." "Therefore there may be some Dispensation for a filial Love to the nobler Part of our Mother Earth, especially if it be without idolatrous and covetous Applications." From this observation, Pettus is led by perceptible steps to discuss the locus of Eden and to affirm that Adam must have had a knowledge of assaying, for the simple reason that otherwise he could not have got any gold.

A good touch occurs in the definition of "Graduation", which "in its Metallick sense is applied to the melioration of Metals, by certain degrees... and the Word is also applyed to Gradnates in the Universities, who by degrees are sensibly Refined by the Literal Arts and Sciences."

Lead is described as governing "Gold and other Metals in their Precipitations." It is noted (and this is historically interesting) that "of late, it is curiously formed into cases of Deal or Cedar, and so sold as Dry Pencils, something more useful than Pen and Ink."

A very diffuse essay on the "Load-Stone" contains not a little sound thought in it. We have space for only one or two extracts. Pettus expresses the belief "that there is an Astral Influence that darts it self through the Globe of the Earth from North to South (and is as the Axel-Tree to the Wheel, and so called the Axis of the World)." He reached this conclusion from observing demonstrations conducted by Sir William Persal who had devised a globular "load-stone" fashioning in the shape of the earth. However, Pettus allows his enthusiasm to carry him a bit too far when he ascribes to a "Knife touch'd to a Load-Stone" the power of entering any part of a man's body without causing pain.

We must pass over a long, but by no means tedious dissertation on mines, noticing only the concluding sentence. Pettus is at a loss to know why the Government did not avail itself of the revenue to be derived from mining. "The Duke of Saxony's Mines (the Territory not so big as England) yields him about £130,000 yearly; now why ours are not made so beneficial to us: I attribute it either to Reasons of State, or want of Knowing the several Arts which belong to the Working of them." It is appropriate to wonder how good Pettus would diagnose the attitude of our own Government.

Under the heading of "Money", a story is told that goes to show that differences in exchange were expertly traded on, even in those days. "It is good for a Traveller to be skillful in the different allays, [alloys], whereby, as a Friend of mine told me, That he had carried out an £100 with him, and with his art of Exchanges, in Country where allays differ'd, he bore his charges of Travel, and brought his stock home again." In other words, the friend manipulated matters so that he came home, after a costly trip through Europe, with as much money as he had when he set out.

Pettus cannot resist the temptation to digress when alphabetical progression brings him to the word "Needle". St. Matthew is quoted, of necessity. "It is easier for a camel," and so on. A couplet from an ancient translation of psalm 45 is thrown in for good measure:—

"Shee shall unto the King be brought,
"In Robe with Phrygean Needle wrought."

All of which, along with much more, lead up to a few sentences about the magnetic needle and the "touch-needle."

Of "Paper", Pettus sapiently remarks that "the Ten Commands were writ upon stone: but for more essay Portage, and transmitting the minds of men one to another, Paper was invented in Egypt from the Bark of a Plant."

A "little Oven of Potters-Clay" was called a "pellican... in allusion to the Bird called a Pelican, which hath a bended Bill, by which when her young ones are poisoned with eating Serpents, she picks an hole in her Brest, and gives her Blood to them, which cures them; and so this Instrument" [the Pellican] "doth as it were suck the blood or spirits out of several Ingredients of which the Aqua Fortis and Aqua Regis are made, and by those waters both Gold and Silver are cured of their poisonous natures." A trifle strained, friend Pettus, a trifle strained!

Stalactites and petrified wood puzzle Pettus very much indeed. Petrefaction he attributes to the action of "volatile lapidinous water," an approximation to the truth.

"Pulverizing" leads Pettus far, far afield into an eloquent discourse on the resurrection, which, in turn, gives him a chance to refer to two discoveries of his, one a cheap powder for firing salutes, the other a preservation powder for pickling meat. Not content with this, he goes on to mention "Powder of Dulcification," or sachet powder, and quotes the poet Herbert:—

"When Hair smells sweet through Pride or Lust,
"The Powder hath forgot the Dust."

We invite our readers to search out the meaning of these lines.

Quicksilver affords another opportunity for a theological and astronomical digression. *Regulus* gives him a chance to work in a trifle of entomology, thus:—Regulus he takes to mean a small king, a king that gives soul and temper to the metals, that they may be of benefit to mankind. Similarly, (though obscurely), the letters of the alphabet are orderly servants of man. So, also "the Bees have a King, and by their obedience to him they enjoy the fruits of their Labours, and take pleasure in returning each to its own Cell, or House, which is guarded with Waxen walls, and filled with Honey... whilst the stubborn, refractory, or lazy Droans are thrown out of their Hives, Houses and Homes." This is not metallurgy, but no forgiveness is required.

The only property of steel specifically mentioned is that if it be "once imbrewed in Men's Blood, it is given ever after to rust and canker."

Towards the last, Pettus has evidently scamped his work. His definitions become more and more meaningless. The definition of yeast, spelled "yest", is, however, worth while. "Yest is... more properly to be attributed to Gold himself, for communicating so great a Secret for the Benefit of Mankind."

* * *

Pettus' attitude towards science was receptive. He was devout, after the manner of the times, but he cringed to the Almighty in much the same way as he cringed to the King.

His Glossary is a vividly human document. From it can be had a fairly adequate conception of how men thought

A Coal Miner's Ears

HEARING THE MOST IMPORTANT SENSE UNDERGROUND

By JOHN MOFFATT

It is not generally realized how much a coal miner depends upon the sense of hearing for his safety and the success of his work while he is in the mine. Even the miner himself does not take the trouble to sit down and think it out, even if the point has come to his notice. But from the moment he leaves the surface through the mine shaft, until he reaches it again, his ears have been of invaluable service to him. There are few deaf working miners, for no man knows better than the miner how much his life depends upon acute hearing. Examination by eyesight plays a comparatively small part in the every-day working life of the men who toil in the coal mine.

Danger Signals

It becomes second nature to the miner, the instant he steps on the cage to descend into the mine, to listen intently. His ear notes every noise, however slight. He knows that overhead is the roof-rock, and with the continuous advancing of the mine the overhead pressure and the influence of the mine atmosphere, this roof is apt to loosen and fall. In the process of loosening, small particles of rock are thrown down, which indicates to a trained ear the condition of that particular place. Even where supported by timber, the first indication of any rock movement above or on the overhanging sides are slight noises or little pieces of dropping rock.

No miner while travelling will pass on after hearing these danger signals without first stopping and listening, after which he will make close examination. To go on would in many cases mean sure death; and if the sounds were directly overhead, to stand still would be dangerous. Usually, however, when travelling, the acute ears of the miner detect all such warnings, and instinctively he knows and does the right thing. Standing almost breathlessly, he notes the movement of the roof rock. He can tell if a great quantity of loose material is forcing its way down or if the amount of falling is small, and he usually knows what length of time such falls will consume.

The Horse's Instinct

Even the pit horse that has been underground for many years understands the meaning of the noises that he hears around him, and the dangers of falling rock. With their quick ears, horses can hear the earth movements far up in the rock beds, and they cannot be induced to pass through dangerous zones when these movements are very active. Most miners have watched the nervous restlessness of the horse at such times. His deep snorting tells of great terror, and if he is confined and cannot rush away from the place he knows is dangerous, his whole body quivers and he cowers as if under some great load.

Sounds at the Face

But is it at the working faces that the real dangers of a coal mine lurk and are to be found. Here new extensions and openings are being made every day and new conditions encountered. Here the miner is on guard for every sound, and his ears keep flashing their signals to the brain all day long. The trained judgment interprets the meaning of every separate sound and determines the closeness as well as the amount of danger indicated.

A large block of coal is being undercut. The miner has to work away under this block, and while he is digging with might and main his ears are set. A slight cracking noise occurs overhead and he must immediately decide whether this is due to some unforseen cause of danger or is the result of the work he is doing. A wrong decision may have serious results, while undue haste to examine the cause of every crackling sound might develop nervousness, lead to a loss of time, and make him the butt of more experienced men.

Or he has blasted down a large block of coal and laid bare new rock, the condition of which is determined by sound. He strikes it with a pick; a solid sound denotes firmness and therefore safety, but a hollow sound tells of danger. Indeed the first thing the miner did when he entered his place of work in the morning was to take a pick and sound all overhead rock to ascertain its condition. During the day and after each shot is fired this work is repeated, for displacement of coal all over the mine means further movement of the overhead strata, and consequently greater pressure exerted over the area that is being advanced. Sometimes in his haste he neglects to sound the roof above him. A small piece of rock falls and he is at once alert. An examination is made and he probably finds enough loose rock overhanging to bury both himself and his "buddie," for coal miners, by law, must not work alone. This he pulls down. Sometimes with all his training and experience he is deceived by sound. It often happens that rock roof contains what are designated by miners as "pots." They resemble "pots" in size and shape and are very smooth, but in reality they take more the form of a cone, being heavier at the bottom than at the top. Herein lies the danger, for suddenly and without warning these "pots" drop, with injury or death for anyone underneath. There are many kinds of these "pots," but from their shape and their smoothness they are all equally dangerous.

Drawing the Pillars

The drawing of pillars requires, in many collieries, miners of great experience. Here the last supports of the earth above are removed. It is dangerous work and the sense of hearing and sound judgment are called into play as in few other callings. A large part of the pillars have been taken out and the roof rock gradually becomes heavy. The wooden props placed for safety begin to grind under the weight. All day long this low grinding noise is heard. Sometimes a timber cracks like a pistol. The whole earth above seems to be settling. Coal is being crushed and falling from the pillar in large quantities, while the rock above is sagging as if under terrible stress. Flat pieces of roof are dropping. Everything around and above is portentious of some great earth movement. Even the atmosphere is tense with coming catastrophe. This is the miners' harvest, for coal is freely tumbling down and he knows

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and wrought before the re-birth of the sciences on which our civilization is founded.

"To conclude, I have writ some things from Authentick Authors and some from my own Conceptions and Observations; now as they pleased me in writing, so I hope they will not displease others in reading."

CAPRICORN

that if it is not quickly loaded away it will soon be buried beneath hundreds of tons of rock. He is now working fast and at high pressure. All inside rails, all tools and everything useful has been removed to a safe distance. The danger increases; the rending and rumbling of breaking rocks is heard far back in the exhausted workings.

Timbers are now snapping, still he works on and listens quietly. Few words are spoken, for danger and death are all around. Experience has taught him that the break will occur far enough back in the gob to give him time to get out, and so he works rapidly to load out the last possible pound of coal. At last it comes and great masses of rock fall with a crashing noise like thunder and a great blast laden with rock-and-dust rushes through that section of the mine, throwing open the trap doors, half blinding the uninitiated and almost knocking down the workmen who have run away to places of safety. But it is all over just as suddenly, and in a few moments workmen walk quietly back to examine the extent and nature of the break and to begin to remove the remaining foundations of the earth until once more another part of it falls with a dreadful roar in angry protest against the rude disturbance by the creature, Man.

ACTIVITIES IN THE CARIBOO

(From a Quesnel, B. C. Correspondent)

Gold mining, the Cariboo's basic industry, is showing signs of asserting its pre-eminence to perhaps a greater degree this year than at any time in the past. The district is receiving the "once over" by a large number of mining men, particularly Americans, who already have a number of scouts in the field.

Among those investigating Cariboo properties is Mr. C. F. Law, who recently arrived with an engineer from New York to develop gold quartz on the old Pinkerton properties on Lowther Creek, as well as other quartz claims on Red Gulch near Mosquito Creek. It is Mr Law's intention to investigate a number of quartz and placer claims throughout the district.

Mr. Joe Errington, representing the McIntyre Mine, Porcupine, is expected to arrive in the Barkerville district about July 1st., to investigate the Proser Pine quartz properties.

Mr. Crow Sowards, who is installing a dredge on Quesnel Lake at the mouth of Cedar Creek, has been examining Barkerville quartz properties and is trying to secure an option on the old Black Jack mine situated on the Williams Creek slope of Proser Pine Mountain. In the early days a one-stamp mill operated on the Black Jack claim, and the several hundred tons milled is said to have been the highest in grade found in the old days.

Mr. L. D. Bonner has spent the past winter drilling to prove up an old channel of Lightning Creek, near Lajoutane. According to drill tests, he has proved a channel paralleling the rich old channel, but considerably deeper. Mr. Bonner is highly elated over the proof of his theory that there was another channel. He expects to operate his property later in the season.

The Hopp properties are operating full-blast. Owing to the extremely warm weather, a short hydraulic season is predicted, unless there is an abundance of rain.

Mr. James Harrison has secured an option on ten leases on Cunningham Pass for $100,000. Mr. Harrison intends testing the placer ground for dredging and expects to have a Keystone drill operating some time in July. He represents an American syndicate.

On Antler Creek, Mr. C. W. Moore, who is handling American capital, has staked a large number of dredging leases. Some of these leases have already been drilled, and have yielded a yardage value of 65 cents per yard. Mr. Moore states that his principals are preparing to instal a dredge.

On Cottonwood and Drift rivers Mr. Dunlop, representing an American dredging company, has secured options on a large number of leases. He has had a drill working on these for some time, and, it is understood, he is getting very satisfactory results. His leases adjoin those of Mr. H. C. Foster, who is drilling the Jim Harrison leases above.

The Pilling property, on the lower Cottonwood, is being drilled by Messrs, Lafferty and Darby, from California.

According to reliable information, Col. C. J. S. Baker, who is at present in England, is expected to reurn to Barkerville shortly, and intends to ereet a stamp-mill somewhere on Williams Creek. Col. Baker owns a group of claims on Proser Pine Mountain, and intends to convey the ore to the mill in a chute by gravity. He is a pioneer in the district, where he has spent the greater part of his life testing properties and conducting researches.

Mr. Clarence Fuller and his partners have bonded their quartz properties on Burns Mountain to mining men from Spokane.

A large number of properties are being opened up in the Kerthley Creek district.

Tertiary Mine, situated near Cottonwood Canyon, has been re-opened after a number of years of idleness, under the management of Mr. D. D. Fraser, who has 20 men employed and is milling approximately 75 tons per day. The material is conglomerate, requiring crushing. Mr. Fraser states that results are very satisfactory.

Mr. S. J. Marsh, who has been in the United States during the winter arranging for funds, is expected back in Quesnel shortly. He intends to instal a dredge on his placer properties on Quesnel River, as well as to ereet a mill near Quesnel to separate gold and platinum values from the black sand concentrate. He has been carrying on experimental work in Quesnel for a number of years.

There is a large dredging area on Quesnel River owned by the Pat Burn interests. Mr. A. D. Whittier, representing these interests, has engaged Mr. James W. Neil of San Franciso to report on this property.

Chalmers & Williams, Inc., of Chicago Heights, Ill., have furnished Mining Machinery to all parts of Canada for many years, including several complete mills, which they designed and for which they furnished the equipment. They have now entrusted their entire Canadian business into the hands of Engineering Equipment Co. Limited, 619-23 New Birks Building, Montreal, who will represent them from Coast to Coast. The addition of this complete line of mining, milling and quarrying machinery places the Engineering Equipment Co. Ltd. ni the very front rank among dealers in high grade equipment and completely rounds out their organization.

Book Reviews

COAL SAVING BY MODERN METHODS OF STEAM GENERATION—by David Brownlie, B. Sc. (Lond.) F. C. S. etc.—Price 2s. 6d. Obtainable from D. Brownlie, 4. Grangethrope Drive, Burnage, Manchester England.

That reviewer is lucky whose task is the appreciation of books that are the fruitage of intelligent effort, well applied and clearly described. The present reviewer places Mr. Brownlie's modest brochure in this category.

Mr. Brownlie's thesis is that "the average net working efficiency of the boiler plants of the dyeing and allied industries is only about 61.5 per cent., and that by..... reorganization ..... on modern scientific lines it is possible to run on a net working efficiency of, say, 75 per cent. with a consequent saving of about 18 per cent. in the coal bill. That is to say, there is far more money to be saved in the boiler-house than in any other portion of the works."

In Mr. Brownlie's opinion this sad lack of economy is in great part due to the fact that the engineer does not regard the boiler-house as within his sphere, nor does the chemist.

In the branch of Industry here referred to the use of coal is not confined to generating power. In fact, between 20 per cent. and 40 per cent. only is thus consumed. The remainder is used for heating and general technical purposes.

The exhaustive series of tests carried out by the author were conducted at 65 plants, large and small. The greatest care was taken to see that every test was made under conditions exactly corresponding to those obtaining during the average working day. Adequate precautions were taken to ensue the accuracy of results. Two detailed tests, one of one day, and one of a week's duration were made at each plant. The fuel used was sampled each hour and each half hour, thus providing continuous checking. As for analysis, the heating value was determined by the Mahler-Donkin oxygen-bomb calorimeter. Ash determinations were arrived at by complete combustion in a muffle furance, thus providing an exact datum point. For the measurement of water evaporated, a pressure type of hot-water meter was used in most cases, working between the boiler feed pump and the economisers.

Feed-waters were sampled every half hour and analyzed by the Wanklyn soap test method before and after boiling. The temperature of feed-water, draught measurement, temperature of flue gases, carbon dioxide in flue gases, steam pressure, and so on, were matters of constant recod.

Analysis of tabulated results shows that 31 of the 65 plants had a working efficiency of less than 60 per cent., only five plants exceeded 70 per cent., and 6 plants did not reach 50 per cent. Obviously investigation was needed.

It is not practicable, within the limits of this review, to discuss Mr. Brownlie's work in detail. It is sufficient to say that there is every evidence of thoroughness and capacity. It is his deliberate conviction that by raising the efficiency of boiler plants to from 70 to 75 per cent. (an ideal readily attainable), 15 to 20 per cent. of the 75 to 100 million tons of coal burned yearly in Great Britain can be saved.

The author's practical suggestions are to the point. We suggest to all of our readers who are interested in steam power plants, the desirabilty of reading and digesting the pamphlet.

THE COLLIERY FIREMAN'S POCKET BOOK—by Thomas Bryson, A. R. T. C., M. I. Min. E. Second Edition, price, 5 shillings; postage, 6d. Published by Thomas Wall & Sons, Limited, "The Science and Art of Mining" Office, Wigan, Eng.

The duties of a colliery "fireman" are not what the name signifies ordinarily. In colliery parlance the fireman is employed to inspect the mine for the presence of noxious gases. His duties comprise examining and reporting upon the ventilation of the mine, the condition of roof and sides, and in general looking after the safety of those employed in the mine. His responsibility, therefore, is by no means light. He must be quick of hearing and sight, and fully alive to the necessity of being always on the *qui vive*.

Mr. Bryson's *Pocket Book* epitomizes very handily the theory and practice that the colliery "fireman" should have at his fingers' ends. Only the simplest of working formulae are used in the course of 19 instructive chapters. The chapters on ventilation and haulage are particularly lucid.

The object of the book is to transmit to the reader a sound grasp of elementary principles, along with sufficient practical details to enable him to understand the application of these principles. Mr. Bryson has achieved that object with commendable clarity.

The British Government, on the recommendation of the Trade Facilities Committee, has advanced the South Crosby Mine, Cornwall, the sum of £30,000. The money is to be used in preparing for further development and for the production of tin ore in larger quantities than in the past.

The imports of iron ore through the port of Middlesborough during April aggregated 108,887 tons. This is the largest amount on record for the last [illegible] months.

According to figures and statements published in the Australian Metal Exchange, through the [illegible] pig iron grew from 209,253 tons in 1918, [illegible] in 1921, overseas competition [illegible]. Labour troubles have brought what promised to be a thriving industry to a practical standstill. The [illegible] labour troubles are even more vividly [illegible] silver, lead and copper industries. [illegible] output for the year 1918 alone was 9,756,[illegible] for the three years 1919-20-21 it [illegible] to 11,553,051 ounces. The copper [illegible] bad, but lead is in a much worse [illegible]

The Lung Yen Mining Company, [illegible] deposits in the region [illegible], has completed the erection of a [illegible] which will have a capacity of [illegible] Nearly all the equipment was purchased [illegible] States. The Chinese engineers [illegible] training in the United States [illegible] Penn and Marshall Van Norden [illegible] to the company.

News and Comments

BY ALEXANDER GRAY

Hollinger Interests Far Afield

While President Noah A. Timmins and General Manager A. F. Brigham of the Hollinger are at the Elbow Lake, Manitoba properties under option to individual Hollinger directors, the same interests have a party making a preliminary examination of the Engineer Mine, situated in the Atlin district of British Columbia, just this side of the Yukon. Results of the sampling of the Murray ground at Elbow Lake have been disappointing, but the district may yet make good. The prospecting has been thorough and it will be interesting to have such facts as those concerned may care to impart. Already various companies have been capitalized and are in the market with market with shares. Elbow Lake is acclaimed as giving "every promise of becoming one of the richest gold fields so far discovered", positively "amazing" in its riches. Mr. Timmins no doubt will have something to say — when he can say it, and knows it. To have another gold occurrence comparable with those of Northern Ontario would be a welcome development. "Unbelievable riches", "unprecedented showings", are delightfully adjectival, and we earnestly hope it will come true. Meanwhile Alphonse Pare is at the Engineer Mine, not far from White Pass, of which his father Dr. Pare, knew something in those exciting days. It is understood an option on the Engineer is held, subject to the termination of litigation since the tragic death of Capt. Alexander. Title is clarified by the decision of the courts.

Why Ontario-Kirkland Mill?

A flagrant departure from sanity was the construction of the Ontario-Kirland mill. The milling grade on 5,300 tons shows a recovery of $2.83 per ton. Who did it? Kirkland Lake mineowners are not speaking kindly of a venture that should not have been attempted. They had enough of misadventure with two other Kirkland Lake companies, now redeemed from mismanagement. What Forbes has accomplished at the Teck-Hughes and Thomas and Goodchild at the Tough-Oakes, may be repeated by Young at the Montreal-Ontario Kirkland, as the merger is styled; and yet that mill is a monument to somebody's silliness.

Dome Mines Developments

Directors of Dome Mines are so reassured that they have doubled the dividend. Their milling grade of $11.11 , even though costs are high, is making satisfactory profit and there is $2,000,000 cash in the treasury, it is said. Of the costs, a third is chargeable to development, and that development is more than compensatory. A 7th. level section is ready to shoot, and then it is expected to have about 500,000 tons of broken ore in reserve, with only a loading, tramming and hoisting charge to apply against it in the underground cost. Now if those fortuitous lenses will only repeat their performances (and there are more of them) with Dome Extension and, perhaps, the Foley-O'Brien doing something, Dome Mines shareholders will have nothing to complain of.

"Promising Gold Find" . .

Cables to the Toronto GLOBE describe " a promising gold find" near Canbelego, New South Wales, a mile and a half from the railway, as having "nine separate reefs, each a mile long", some of the ore "yielding thirty to forty ounces to the ton," the average being "twelve ounces" — the whole thing outrivaling anything ever seen. Where the emu grazed, sourdoughs are planting their pegs. Excitement is intense. Ballarat, Bendigo, Koolgardie and Kalgoorlie being somewhat out of date, the hardy annuals who used to "carry the swag" (which is another form of "packing" your own worldly belongings) are digging in for all they are worth. To have twelve-ounce rock by the nine miles puts other recent finds in eclipse. New South Wales climatically and geographically is admirably suited for such a development — if the labor unions do not confiscate proprietary rights. Without the Ballarat and Bendigo gold rushes, Victoria would have had more kangaroos for a longer time. When my old partner, "Tom" Cue discovered the Murchison county in West Australia, he did some map-making. Mt. Morgan, in Queensland and Broken Hill, in South Australia, each served to keep alive mining in Australia. Now it is just possible, when that country is in need of gold, New South Wales may supply the element necessary. But no one hereabouts has ever seen anything so near the miner's ideal as the "find" the Globe announces.

Incoherent Legislation

Along comes Thomas A. Edison, at the instigation of Henry Ford, with a panacea for agricultural producers. Perhaps Mr. Ford put one over on the Menlo Park wizard, or the suggestions may be the sequel to their alarum lest synthetic gold upset the apple-cart (or the beanery). At any rate, Mr. Edison proposes a Central Farm Bank that will loan money without interest to the extent of 50 per cent. of the value of crops, based upon twenty or twenty-five years' average prices of agricultural products. All the borrowers would be required to do would be to pay the overhead for a chain of government warehouses in which the crops are to be held as security against loans.

Mr. Edison also would make loans upon bituminous coal, (why not anthracite?) and would provide storage facilities, thereby insuring regular production and more scientific distribution. The latter arrangement, in the Edison reckoning, would give the coal miner steadier employment and would permit of the lowering of wage schedules. Unfortunately, though, there are others who would not object to a share of these benefactions. Altruism of this variety and as outlined, to be satisfactory to all, would have to include manufacturing establishments, trades, and other miners. A few months ago, there was strenuous objection to bonusing gold producers, who sought less than silver producers are getting under the Pittman silver purchase act. The purport of the outcry against the McFadden Bill was that it was an obnoxious specific, a sort of patent medicine with a dash of "hootch" in it. In seeking to bolster a class or

two at the expense of all other classes, therefore, Messrs. Ford and Edison are rather chasing chimeras. Gen. Smuts, being an ideal materialist, prescribed a more effective remedy for farming and labor grievances, namely, work and sweat. Farm and Labor Blocs would be in all-the-year-round clover with such banks keeping open house, while the generality of industries and trades took their chances in the hard, cold world.

Laying it on Thick

Bryant Brothers joined the refrain when they advertised Elbow Lake, in this strain:

"The ore body is a tremendous one and the values received from careful assaying over a large area are amazingly rich".

Why go to the jungles of the Congo, as New York's Gullible Gullivers have done, to pick up gold nuggets by the ton in a donga?

Pity 'tis, 'tisn't true!

Doubly "tremendous", "unbelievable", "amazing"! If Elbow Lake averages up to sample the literary specimens the New York Argonauts who have gone after the equatorial Eldorado had better make a strategic retreat and trek to where "every prospect pleases".

It is an unfortunate fact that the most prominent participants in this Elbow Lake development—the gentlemen whose field force knows more about the section than all others—think the Arab who folded his tent and silently departed, was exercising a discretion that is the better part of valor.

Those of Toronto and Montreal who hold to the opinion that the values are not what the advertisements represent them to be, do not seem to be credited with even common sense, notwithstanding as a private syndicate they subscribed a tidy amount, made a road, built camps, provided the equipment and paraphernalia requisite for prompt determinations. Speculators accuse them of "knocking". They are to get out, not in.

Hollinger Buys Schumacher

Hollinger Consolidated hold an option to purchase the Schumacher mines and belongings for $1,650,000. Of this sum, ten per cent has been paid as earnest money on the option. If upon examination during the ensuing six weeks the Hollinger management so decides, $300,000 is to be paid and the remainder, $1,185,000 is to follow in quarterly installments of $296,250 each. The transaction is in the nature of a speculative investment, made with knowledge which the Hollinger Administration alone possesses. Acquisition of a further 160 acres, as acreage, is not the reason for it. Nor is the Schumacher Townsite a consideration. As greater depth is attained in the Acme area of Hollinger, it has been noted that the drag of a very important vein series is toward the Schumacher. At least one vein of the series is so rich, it will not take much of it to materially assist in earning the purchase price of the Schumacher. So Schumacher shareholders get their portion in cash and "the rich, they ride in chaises".

Dean Adams has More Honors Conferred

McGill University announces that Frank D. Adams, Vice Principal, Dean of the Faculty of Applied Science, and Logan Professor of Geology, has been appointed Chairman of the Advisory Council for Scientific and Industrial Research, Ottawa, by the Governor General In Council. The selection has everything to commend it. Something more than a grub stake for Research now would further national purposes.

ANNUAL REPORT OF THE DEPARTMENT OF MINES OF NOVA SCOTIA FOR THE YEAR 1921

Prosperity did not smile on Nova Scotian mining last year. In every branch of mining save one, either a decline was recorded or else there was complete stagnation. Better things are confidently expected this year.

Coal production, which has already received attention in these columns, dropped from 5,687,970 long tons (1920) to 5,373,230 long tons. We refuse to reproduce the half ton attached to both these tonnages, because the fraction does not strike us as being exact. It may have been jettisoned in both cases by distraught mariners. The production of pig-iron, steel and coke also fell, as has been heretofore recorded. Limestone and dolomite outputs dropped to 79,132 tons, the output of the year 1920 having been 249,993 tons. Gypsum is credited with a slight increase, the total production being 185,943 tons. Calcined gypsum, we are glad to note, rose from 5,089 tons to 16,415 tons.

To the list of coke oven by-products is added motor fuel to the amount of 292,452 gallons.

Gold production was nominal, 379 ounces, as also that of manganese ore, 450 tons.

Salt, from the Malagash salt deposits, yielded a smaller tonnage than in 1920, the amount being 2,606 tons. Infusorial earth would have been worked on a larger scale (only 300 tons reported) had it not been for poor transportation from the deposit (Silica Lake, Colchester County) to the railway. The mining of barytes has fallen into an innocuous desuetude.

Coal mining, which is a well-organized and admirably modern industry in Nova Scotia, is the support and stay of the Province. It needs no advertising. What is needed, however, is that Canadians in other provinces should realize the enormous industrial possibilities that are offered in Nova Scotia in connection with mining and quarrying non-metallic minerals. Gypsum, for instance, should and could mean much more to the Province than it does. So should barytes and so will, unless we are much mistaken, the exploitation of salt beds.

We note with pleasure a distinct revival in gold prospecting. This, we hope, will lead to tangible results.

The staid and utterly respectable Provincial Government above all things a thorough investigation into mineral wealth. This cannot be done in a day or a year and should be done by [illegible] picked outsiders.

Our subeditorial eye is pleased with the [illegible] printing and paper of the Annual Report. Much [illegible] ever, is left to be desired in its arrangement. The pages assigned to non-metallic products are [illegible]. The information vouchsafed on [illegible] a trifle amateurish. Also, the Lord [illegible] referred to, has noticed two [illegible] have escaped the proof-reader. For [illegible] fore. One is the use of the word "[illegible] ear" is meant (page 111) and the [illegible] —chute" when "shoot" (scale at the [illegible] meant (p. 97). An index would add [illegible] Report.

Despite our trivial criticism, the Annual Report is much above the average in [illegible]

News of Mining

United States

As reported to the United States Geological Survey by producers, there was a decrease in the amount of all lead pigments sold in 1921 as compared with 1920, with the exception of white lead in oil, which advanced 2% per cent. Prices per ton also fell during 1921. Of white lead in oil there was sold 143,631 tons; of dry white lead, 26,695 tons; of litharge, 11,953 tons and lesser amounts of other pigments.

Official figures show a great falling-off in the production of magnesite in the United States during 1921, the output being 17,901 short tons, less than half of the preceding year's output. Production was confined to California, where the magnesite was almost wholly used as plastic material. Imports of crude magnesite were greater than in 1920. The apparent total consumption was 113,500 short tons, the market for refractories being unsettled.

Only a few hundred tons of chrome ore was mined and shipped in the United States last year. The tonnage imported was 81,836 long tons, having an average value of $8 per ton. From French Oceania came 35,-108 long tons, and from the British South Africa, 23,-318 long tons. Greece and Asiatic Turkey produced most of the remainder.

Great Britain

The British Fuel Research Board has issued a report of progress in its investigation of low temperature carbonization of coal. Stress is laid on the unimportance of pulverization and pre-briquetting. Research is being continued in the development of methods of coal-carbonization at temperatures approximating the fusion points of given fuels.

Exports of coal from Great Britain for the four months ended April 30th., 1922, totalled 17,333,082 tons, of an average value of 22s. 8d. per ton. France was by far the largest buyer, taking 4,572,147 tons. Italy came next with 2,022,520 tons; then the Netherlands, 1,-551,778 tons. Germany and Belgium were important customers. The Argentine Republic purchased 562,630 tons.

In answer to questions asked in the British House of Commons, the Secretary of Mines, Mr. Bridgeman, gave out the information that the sums paid out by the Government to the coal mining industry exceeded the sums collected from it by £25,767,443 during the fiscal year 1919-1920. Taxation was not included in the estimate of collections. The excess of payment for the last 12 months was £6,873,883.

Europe

A revival of gold mining is reported in Bavaria. A small area in the Fichtel Mountains in the scene of considerable activity. From arsenical ores a yield of 15 to 20 per cent. of arsenic has been obtained. The ore carried an average of 35 grains of gold and 22 grains of silver to the metric ton.

Excepting a few coal mines in Upper Silesia, the 7-hour bank-to-bank shift is in force in Germany. The German Government has submitted to the Reichstag a bill to legalize the 7-hour shift throughout Germany, with the probable exception of upper Silesia, where the 7½-hour shift is likely to be maintained.

Oil production in Rumania is showing an increase of more than 20 per cent. over the rate of output during the year 1921. The production in the Baku (Southern Russia) fields has also been considerably enlarged.

Denmark imported 531,918 tons of coal during the first quarter of 1922. Nearly all of this came from Great Britain. Imports from the United States fell to only 86 tons, as compared with 61,265 tons during the corresponding period of 1921.

The Norwegian Arbitration Court has fixed the number of legal holidays for industrial workers at eight working days in the year.

The first deliveries of Wabana iron ore were made to German purchasers during the middle of May. They amounted to 20,000 tons.

French consumption of coal has declined so markedly as to affect domestic production. German coal producers are urging a reduction of the amounts of coal deliverable by Germany to France under the indemnity rulings.

Australia

Reductions in wages of two shillings per day at the smelters, and a lowering of the price of coal, are two recent developments that are expected to give timely help to the Broken Hill mining companies. Another encouraging feature is the strengthening of the market for lead.

For the first three months of the year, the Queensland output of gold was only 2,717 ounces. During that period the Mount Morgan plant was closed. Work at Mount Morgan was resumed in April and the month's output of the State was brought up to 6,219 ounces.

Africa

According to the official returns of the Government of the Union of South Africa, the value of supplies purchased by the gold mines during 1921 was £14,439,-837; coal mines £1,854,205; diamond mines £917,268; other mines, £347,548; making a total of £17,558,858. Of this amount more than £2,000,000 was spent in explosives, and about £414,000 in cyanide. In addition to the tremendous total mentioned above, £811,916 was expended on machinery and machine tools, and £524,554 on electrical machinery and equipment.

The output of asbestos in Southern Rhodesia during March, 1922 was 436.58 tons, valued at £15,179. The principal producer was the Rhodesia and General Asbestos Corporation Limited, operating in the Victoria District. This company produced 377.19 tons, valued at £9,429. No chrome ore was mined.

The total output of gold from the Transvaal for the month of April, 1922, was 511,388 ounces, valued at £2,352,155. Of this the Witwatersrand contributed 493,-402 ounces.

The Swaziland April output of tin concentrate is reported as 23.5 tons, valued at £262.

Notes From Nova Scotia

STORING COAL

Since coal began to be mined and shipped in large quantities from Cape Breton, the storing of coal in winter has been a common practice. This is due chiefly to the climatic conditions — when the great water-way of the St. Lawrence is frozen up and the distance by rail is too far to permit of profitable business. In the latter part of November the river buoys are taken up and shipments of coal to Quebec ports practically cease.

As navigation only opens about the middle of April, or later if the drift-ice is on the coast, the shipping season is short and preparation must be made during the winter months to supply the St. Lawrence market within the time available. And so, year after year large coal heaps or piles are stored to facilitate rapid shipment.

A large coal heap looming up in mid-air at a distance may not be an attractive sight. One must get to the top of it, however, and walk over it with a person who understands its different moods, to know that it is not the black, dead, inert mass it appears to be. It can at times become very lively and if not under the control of a master hand, it will by its own action quickly consume itself.

A 300,000-Ton Heap

The writer had the pleasure the other day of walking over one of these great heaps containing about three hundred thousand tons of coal. He was accompanied by the foreman, who for many years has been building and shipping the coal piles of the Dominion Coal Co. This heap was 800 ft. long by 800 ft. wide, being 22 ft. high at the beginning and 38 ft. at the apex. The walk with Mr. Mullins, or "Joe," as he is familiarly called, was most interesting and instructive. A man whom most others call by his first name, to retain the respect of his fellows must have some popular quality to permit of the use of the name used only by his closest friends. Joe Mullins has many fine qualities. At first sight he strikes one as somewhat rough, but it is only the roughness of the unpolished diamond. Joe has a heart big with human instinct and with that "spark of nature" which "makes the whole world kin." And although he at times be as volcanic in temper and use the English language as "soldiers did in Flanders Field," yet few were the men who ever worked for him who did not carry away a respect bordering on affection. Probably the precarious nature of his duties blends itself with his disposition, and Joe is only acting in unison with the hidden, heated, struggling elements of the coal pile that are forcing a way out to larger liberty. Whatever vent the pent up feelings of Joe may have, he allows the coal pile none but in his own way. It must, of course, at times be relieved of its heated breath but only through the breathing tubes prescribed by the master builder.

The Storage Floor

The coal floor is of hard, dry clay, well drained and of ample size, five hundred thousand tons of coal having been stored on it at a time. As run-of-mine coal from many different collieries is placed in the pile, it will be seen that the many precautions of theorists cannot all be followed out. Where coal of low and high sulphur content is mixed, together with lump and small coal at the rate of thousands of tons per day in rain, snow, sleet and sunshine, one who knows anything about stocking coal knows that only average care can be taken and the heap may become at any time a dangerous proposition to handle. Yet the storing of coal in this way has been carried on for many years, and no fire has ever occurred necessitating the removal of any part of the pile or the use of water. This is no doubt largely due to the fact that the work of piling and caring for such great bodies of coal is under the supervision of a man of long experience and one who is still a student with ever deepening interest as new problems arise.

In the storing of coal, besides the quality and the size, the height of the pile and the length of time it must remain before it is moved must be considered. These are two very important factors.

The Causes of Spontaneous Combustion

It has been thoroughly demonstrated that heating in the coal piles arises from oxidation of the coal. Fine coal, sulphur and iron pyrite are conducive to heating. Mr. Mullins tells of having uncovered and examined a small "hot pot" which was about to be shovelled away. In appearance it was yellowish, being mixed with impurities and fine coal. Through heating, a crust had formed above, which would render it impervious to water. This crust was due to the distilling of volatile matters under heat. As heating usually begins at the centre of the pile, or half way between the floor and the surface, it has been found that thirty eight feet is high enough for safety and control.

Heating usually shows itself within ninety days, and great care must be taken where coal of all kinds and sizes have been indiscriminately mixed. Of course this mixing is only done when it is understood that the pile will be removed within four or five months. By careful turning and ventilation, such heaps may be kept cool for a longer period but where piles are expected to remain for eighteen months or two years, lump coal only should be stored. At the end of two years the lump coal begins to disintegrate and heating ensues.

Run of mine coal with fifty per cent lump can be safely stored for nine months provided coal from the seam is not mixed in. But a large heap of this coal requires careful watching and constant treatment to keep it cool.

Stock coal in large heaps will do very well for months and is handy to cart off when large sales are made. The heat makes it run down easier instead of sticking as in other cases. Even washed coal has been known to heat and reach a dangerous state before it is removed.

Weather conditions do not seem to affect the [illegible] of coal but run-of-mine prefers dry to wet weather.

Pointing to the top of a wooden trough, the question was asked if it was not almost impossible to

dump coal around a wooden structure. The answer was that experience had taught there was no danger, and the legs of the trestle did not seem to make channels for air circulation which would cause heating. To avoid breakage, the trestle is low where dumping begins and gradually increases in height as it extends. Care is taken in all dumping from the trestle that fine coal is not allowed to gather in quantity around the legs of the trestle.

Heating in the early stages is hard to detect, especially if the weather is dry, clear, and warm. But in the late evening and early morning, if close watch is kept there is no difficulty in discovering heat if present. Of course the iron rod for temperature tests is freely used after coal has been in the heap for about three months. In the absence of steam or an iron rod, heating may be detected by the oily appearance of the surface of the coal and sometimes by smell.

Cooling Hot Spots

Once located, the "hot pots" are cooled off by means of holes left in the coal after the iron rods that have been forced down through the pile have been withdrawn. Cones made of roofing paper, nine inches long and three inches in diameter are stuck into the mouths of these holes. The cones keep the holes open and allow the heat to escape, which cools off the pile. Hundreds of these cones can be seen in clusters here and there over parts of the great heap. This method of cooling has been found most effectual, and no case of fire has ever occurred where it has been used in time and the pile has been removed within the period set at the beginning.

After a hot place has cooled off, heating may again occur. This second reaction sets up a greater heat which is harder to control than was the first. In 1918, when the war was on and vessels for coal shipment were scarce, re-heating occurred in three separate places because the pile had to remain on the surface much longer than was at first intended. It was a matter of grave concern to the Company, and after consultation, it was decided to reventilate those places. The heat, however, became more intense and continued to spread. Instructions were issued to continue ventilating. The danger of carrying this practice too far was pointed out but was not heeded. Two of the "hot pots" were ventilated and the third was secretly damped down. This was a test case "on the quiet". The result was that when the steam shovel reached these places, it was found that the re-ventilated "hot pots" had spread over a considerable distance and the heat had been more intense than in the one that had been damped down.

Skepticism may arise in the mind of the inexperienced as to holes made in the coal remaining open, but this is soon dispelled after once seeing a ventilated hot spot bared by the steam shovel. Hundreds of holes, the whole length of the twenty-foot iron rod used, may be seen standing just as they were when formed.

"Bumps" in Nova Scotia and British Columbia

Bumping is a condition common to coal seams with a strong roof and a floor not quite so hard but yet harder than the seam itself. It is usually brought about by faulty methods of mining, hence its only correction lies in improving these methods. It is not known to good methods of longwall mining. There are, however, other causes which in very thick seams are hard to control.

The experience of Crow's Nest Pass collieries, which led to an investigation by Mr. Rice of the United States Bureau of Mines, was eagerly followed by all mining students. His report was most illuminating and his recommendations are being closely followed.

Speaking of No. 2 Mine Coal Creek, affected by bumps, Mr. Rice states: "The workings are irregular. In some places longwall mining was started in irregular panels. In the bump area 50 or 60 percent of the coal had been mined out. This correspondingly increased the load on the pillars which bore the weight of 2,000 feet of cover." The remedy applied was to shut up the area of disturbance and in the East and West side very large pillars were left. This seam is from 4½ to 5 feet thick.

"No. 1 was the most systematically planned of all the Coal Creek workings, and the advance plan was rigidly adhered to. There was a 150 ft. pillar between each pair of rooms. Only 25 percent of the coal was taken out by this method until the mine was retreating as a whole. The mine passed over the bump area of No. 2 mine without noticeable effect. Later on, however, No. 1 Mine was affected by bumps, but it is thought that if No. 2 Mine, which underlies No. 1, had been worked as systematically as No. 1 and large pillars left in, no bumping would have taken place."

The 10 yard seam, South Staffordshire, has been seriously menaced by bumps, due no doubt to the breaking of the massive strata higher up, which gives way after the subsidence of the immediate roof, which takes place when large areas of coal are extracted.

The great danger in Springhill when bumps occurred was the sudden heaving of the floor, and the road bed being raised to the roof over long distances.

Away back in the eigthties and nineties it was considered good mining practice to open up large areas in Springhill Collieries. The room and pillar system was used, but it was found that great loss of coal occurred through crush, and the sections opened were gradually reduced to a few balances or chutes on the same lift. This method has had to be further modified, and concentration on small districts is now the practice. The success of the improved method clearly proves that when the overburden is relieved by caving in the waste workings, the pressure of the strata above is regulated and the danger of bumps eliminated.

A recent authoritative review of the iron and steel business of Great Britain shows that the mother land is now in as sound a position as world conditions will allow. Costs have been so completely deflated that Britain can now sell her iron and steel, as formerly, in free competition with the world. Only a resumption of the home demand for iron and steel products, such as would be occasioned by the renewal of shipbuilding, and the strengthening of the markets for export will bring production up to normal. Meantime, it is satisfactory to note that Britain is still able to hold her high place in the world's production of iron and steel.

British Columbia Letter

Alice Arm

The new ore-body above the old workings at the Esperanza mine is opening up well, the ore showing well in native and ruby silver, and it seems probable that a good body of ore will be developed. Some 500 sacks of high-grade ore and 30 tons running $45 per ton have been taken from the mine recently, and this will be moved to Alice Arm for shipment as soon as the trail is in a fit state. An Anyox syndicate has taken a three years' bond on the Midway group, adjourning the Esperanza. Surface stripping has exposed a strong vein, showing ruby silver freely in places. The purchase price is $25,000.

Anyox

A fire at the Granby smelter, caused by the spilling of matte from one of the converters, completely destroyed a couple of motors and did other slight damage, all of which is covered by insurance. The damage will not delay production. Work on the new dam is progressing rapidly, a number of carpenters having been taken on recently to make the forms for the concrete work. It is rumored that the company shortly will start work on the concentrator for the treatment of a large reserve of silicious ore of too low a grade for satisfactory treatment by pyritic smelting. The directors recommend the erection of a 1,000-ton concentrator for this purpose in the annual report for the year ending December 31, 1921.

Dredging on Peace River

The Peace River Gold Dredging Company is making preparations for extensive placer mining operations on a series of benches, known as Brennan's Flat, on the Peace river above Hudson's Hope. A saw mill with a capacity of 40,000 feet of lumber daily has been erected, and lumber for flumes and other purposes is being manufactured rapidly. Seven carloads of machinery including the machinery for a suction dredge, are on the way here from Edmonton, which is the headquarters of the company.

Activities Round Nelson

A compressor, which has been purchased from the owners of the old Standard mine, has been erected at the McAllister mine, for the purpose of driving a long tunnel to cut the ore body at depth. This work was recommended by R. H. Stewart, who recently made an examination of the mine, and will be pushed through with all possible speed. In the meantime some fairly good ore has been found in the bottom level of the present working, and ore shipments are likely to be continued.

The Cork Province mine, which has been reopened recently after a long period of idleness, is said to be in excellent condition. There is a large body of ore in sight and it will require comparatively little outlay to develop this ready for shipping purposes.

The new zone schedule at Trail, which went into effect on June 2, seems likely to cause a marked revival of mining in the Slocan district. Already the Silversmith, the Standard, the Rosebery and the Noble Five have shipped concentrates that they have had on hand for some years, and to avoid a congestion of the concentrate at the smelter the Consolidated company has had to notify shippers to advise it in advance of making shipments of this class of concentrate. After the accumulation that has been piling up for years at some of the mines has been treated, there will be ample capacity at the smelter for handling all the concentrate produced in the district.

There has been quite a revival of mining in the Sheep Creek district, new discoveries having been reported from the Bayonne and the Reno groups where steady development was carried on through last winter. The Bayonne group is under option to J. B. White president of the Silversmith Mines, Ltd., and the Spokane associates, and the Reno group is being operated by a local syndicate. Another local syndicate has just been formed to explore ground in the neighborhood of the Reno group.

At a meeting at Nelson, recently, the Mining Association of the Interior of British Columbia decided to petition the Provincial Government to amend the Engineer's Act so that its provisions shall not apply to mining and metallurgical engineers. It is claimed that in its present form the Act is detrimental to the mining industry, in that it hampers the movement of engineers and tends to prevent the investment of capital in the mining and metallurgical industries of the Province. The Association decided to send a request to the Minister of Mines, too, that it be consulted before any further steps are taken to safeguard metalliferous mines.

Activities in the Omineca

J. R. Turner, manager of the Mamie mine, on Hudson's Bay Mountain, has secured permission to tunnel through the Payroll claim, in order to tap the vein on the Mamie claim. Work on the tunnel will be started as soon as the compressor and other necessary plant can be got to the property. It is expected that the tunnel will be about 1,250 feet long, and will cut the vein at 100 feet depth.

Milling operations have been suspended temporarily at the Silver Standard mill, pending the installation of additional plant to better effect a separation of the zinc and lead sulphides. W. Norrie Lowenthal, general manager of the mine, has left for Vancouver, where he will consult with the directors of the mine with regard to the new plant.

The Cedar Creek Placers

An Okanagan syndicate represented here by [illegible] F. Guest and Fred Munsen has purchased the Snowden and Sheridan Company's claims, on Cedar Creek, for $200,000. The purchasers made a sworn [illegible] to the effect that the pay-gravel was [illegible] an ounce to the yard, and that on May 29, [illegible] and sixteen pennyweights of gold was [illegible] cubic yard of gravel.

Several law cases already have arisen [illegible] ing of claims, and many others are likely to arise before the season is over. Alfred Platt, [illegible] of gold in the high benches above Cedar Creek, has been enjoined by Justice Morrison from trespassing on the property of Edward G. Stephens. The Stephens lease adjoins the Platt leases, and [illegible] latter was staked in such a manner as [illegible] the former.

A considerable number of prospectors, who [illegible] the warnings of those familiar with the [illegible]

here long before the snow had melted and not suffiently provided with funds, are now stranded and unable to get away.

The Portland Canal District

G. D. B. Turner, of New York, has secured a bond on the Del Nort group, which is situated on Porter Creek, a tributary of White River, across the glacier from Bitter Creek. A belt of ore is said to have been traced for 4,500 feet and is in the neighborhood of 200 feet wide. The average of 24 assays taken here and there on the belt is said to be $40.80 in gold and silver, the lowest being $1.80 and the highest $285.00. This is practically the first property on the Naas slope on on which any development has been done. Mr. Turner has also secured options on the Portland Canal mine and on other properties on Glacier Creek.

Owing to the fact that the creeks are full of water, the Premier hydro-electric plant has had a surplus of power recently, and the company has been running the mill and the tramway on three shifts daily, consequently a considerably larger tonnage of ore and concentrate is being shipped from the mine. The line has given a little trouble, owing to the towers settling since the frost came out of the ground, and the tramway has had to be stopped for short periods from time to time while the level of the towers was being readjusted. Shipments for the first five months of the year run well over 30,000 tons.

While denying the rumor that the Jacklin-Thane interests have purchased a controlling interest in the Fish Creek Mining Company, W. R. Tonkin, president of the company, who recently has returned from the the South, stated that they had put considerable capital into the concern and that an active campaign of development would be pursued during the present summer

The Trail Smelter

The ore shipments received at the smelter for the first five months of the present year amounted to 193,387 tons which is 17,000 tons in excess of the same period of last year. The great bulk of this has come from the Sullivan mine. Soon after the news that the shareholders of the Consolidated company had approved the floating of a $7,500,000 convertible refunding debenture bond issue at a special general meeting, held in Montreal on May 30, G. F. Chapman, mechanical superintendent for the company, was sent to Kimberely with a small force of men to start on the construction of the new 1,500-ton concentrator for the Sullivan mine ore. It is expected that the plant will be finished early in 1923, and that it will cost between one and a quarter and one and a half million dollars. The new plant will be constructed almost entirely on the site and in the well-equipped machine shops at Trail. When the plant is completed it will release the 1,000-ton concentrator at Trail that now is being used to dress the Sullivan ore for use on the company's Rossland ores. Thus with the new year, increased activities may be expected at both the Kimberley and the Rossland camps.

Engineer Mine

In the British Columbia Court of Appeal on June 6, Chief Justice Hunter gave the ownership of the Engineer mine at Atlin to the estate of the late Captain James Alexander. The case has dragged through the courts for so long, that Alan I. Smith, to whom Alexander left the mine, has died; so his heirs, and not he, will reap the benefit. The purchase of the mine was under consideration by the Mining Corporation of Canada at the time that Alexander died, the price, it is reported, being set at one million dollars. There was a fabulously rich shoot in one of the veins on the property, from which Alexander must have taken a small fortune by the crudest methods. There are some 25 other veins on the property about which little in known, as no important development has been done..

BRITISH COAL TRADE

The important feature of the coal trade during the past month is the effective recovery by the United Kingdom of markets which were lost to the United States of America during the European War. The dispute in the American mining industry has undoubtedly hastened the inevitable change. The American exports to Argentina in February, 1922, amounted to 4,000 tons as compared with 51,000 tons in February, 1921; the corresponding figures for Brazil being 17,000 and 42,000 tons respectively, while those for Chile are 7,000 tons and 40,000 tons respectively.

The figures of exports of United States of America coal to South American markets for the eight months ending February 28th, 1922 and 1921 respectively, are still more striking. These figures are as follows: Argentina, 277,000 tons and 1,243,000 tons respectively; Brazil, 174,000 and 672,000 tons; and Chile, 14,000 and 458,000 tons. In all cases the 1922 figures show a substantial falling away from the 1921 figures.

In South Wales particularly, there is a very definite expansion of proceeds, which doubtless reflects the influence of the rise in price (2s. 6d to 3s 6d. per ton for large steam coal) that took place in February. The rise, however, is not only in value, but also in bulk. These two factors together may perhaps be taken to portend a definite and progressive recovery in the industry.

Coal Output.—The Easter period naturally caused some falling off at that time, but the rate of output marked a very rapid recovery in the last week of April, when the figure of 5,160,100 tons was reached. This is not only the highest since the coal stoppage of 1921, but has not been reached since the week ending 18th December, 1920.

The total output for the four weeks in April was 18,049,500 tons, as compared with 19,920,100 tons in March.

A Stockholders' Committee of Investigation of the American Smelting and Refining Company has issued a majority report urging the election of a new board of directors, the bulk of whom would be independent of the present management. The Hon. Elihu Root concurred in the minority report. The majority report embodied the following criticism: "We believe that the present policy of having a Board of Directors composed so largely of salaried employees is not the best form of corporate organization, and that it has not always worked to the advantage of the Smelting Company..... The interests of the Company imperatively demand a Board of Directors of whom a clear majority, while co-operative with, would not be dominated by the management." Senator Root, contrary to current belief did not act as arbitrator, but as the attorney of the company. The company's annual meeting is to be held on June 27th. Proxies are being actively solicited by a committee of the management.

Northern Ontario Letter

Dome's Output in May

According to official advice just received by the Journal the Dome Mines handled 28,400 tons of ore during the month of May and produced $325,328 in gold, this being the second highest production for any one month so far in the company's history.

The only previous month in which the Dome produced more gold than during May was in the month preceding when the high total of $377,000 was produced. These figures now show that for the first five months of the current calendar year the output from the Dome has reached approximately $1,630,000 and points to the likelihood of the output for the full half-year reaching close to $2,000,000. Approximately three-fifths of this gross yield may be estimated as net profit.

A feature of current achievements at the Dome is that during the two months since the Company commenced its fiscal year on April 1st it has produced $702,328, or at the rate of about $4,213,968 a year.

During the month of May the mill treated an average of 916 tons of ore daily and the ore yielded an average of $11.52 a ton.

Progress on Goldale

Sinking operations are under way on the Goldale property ,and rapid progress is being made. Four machines are being operated and the shaft is going down at the rate of between 25 and 30 feet a week. A small station will be cut at a depth of 350 feet, but the first working objective will at a depth of 500 or 550 feet.

Lake Fortune, in Quebec

A small force of men are at work on the Lake Fortune property, situated in the Province of Quebec and lying about 25 miles east from Larder Lake.

This old property was staked out about two decades ago. An effort was made to develop it at that time, and a twenty stamp mill was installed about 14 years ago. It is stated that the cost of machinery and the heavy expense in transporting the equipment over so great a distance without the aid of a railway amounted to about $275,000.

Present work is for the purpose of determining whether the gold content of the veins is such as to offer promise of yielding a profit under the present improved methods of mining and milling.

Success in this venture would attract widespread interest to a big district in the province of Quebec.

More Ore Located in Kirkland Lake

One of the more important developments in recent months in the Kirkland Lake district has just taken place on the Tough-Oakes and Burnside mines of the Kirkland Lake Proprietary, this being the discovery of the continuation of the "main break" to the east of what is known as the north and south fault.

Up until recently, the occurrence of this main break was only proven on the west side of the north and south fault and as this fault lies within 300 or 400 feet of the west boundary of the property, the length of the ore zone was limited to this 300 or 400 feet. It is now learned that the break, after being faulted a limited distance, continues toward the east apparently through the full breadth of the property.

Other information coming to hand about these properties is that the work at the 550-ft. level is producing highly favorable results and that the drift on the foot-wall side of the break is in high grade gold ore.

It is also learned that the drifting being done at the 400-ft. level on what had appeared to be No. 11 vein has been suspended for the time being while a cross-cut is being driven farther north. The nature of the vein drifted on has led to the belief that it may only be running parallel to No. 11 and that the latter may lie 40 or 50 feet farther north.

All this work is well in hand under the management of Mr. Thomas and the whole enterprise is gradually being built up to a positionof importance. The mill is operating on from 60 to 70 tons of ore daily for the time being, and, in due course, will be brought up to full capacity of 120 tons daily.

While this work on the Tough Oakes and Burnside is producing such good results, it is important also for the Kirkland Lake Proprietary that the adjoining Sylvanite mine is developing in a big way, in that the Proprietary owns a fifty per cent. interest in the Sylvanite.

Mr. Harry Oakes and Lake Shore

Now that Mr. Henry Oakes is home, the question of mill enlargement on the Lake Shore will come up at an early meeting of the Lake Shore, and the indications appear to be that such a plant will become a reality and be producing bullion during the coming year.

The manner in which the affairs of the Lake Shore have been directed from the very beginning under the guidance of Mr. Oakes may be pointed to as one of the finest examples of the kind in the annals of mining. This includes the staking of the mining claims, the straight forward method of promotion and the entire process of performing assessment work through all stages righ up to the production of gold bricks and the payment of dividends.

Now the Lake Shore is on the eve of an attainment for which even Mr. Oakes' fondest dreams scarcely provided at the time of his undertaking the enterprise.

Development in Lebel Township

A force of 18 men are at work on the Bryce group of claims in the central part of Lebel township, in the vicinity of the Lebel Lode.

Also, a force of men are at work on the Munro Kirkland, this being recently taken over by the Thompson interests of New York.

Indeed, in almost every direction in this section of the Kirkland Lake field, exploration in one form or mother is either under way or being arranged for on the great majority of mining claims of promise.

Cobalt Frontenac Curtails Operations

According to advice just reaching here, the Cobalt Frontenac property, situated near Kalador, has curtailed operations. No official advice has been secured but workmen have brought the information that milling operations provided a distinct disappointment and that work was finally curtailed.

The proposition has been promoted by the Fletchers of Hamilton.

Prospecting on Mutual Porcupine

The Scheme of the Mutual Porcupine Gold Mines Syndicate to raise money with which to explore property lying adjacent to the Hollinger Reserve shows indica-

tions of success. Surface work has already commenced and the question of diamond drilling will be taken up at an early date.

Murray Mogridge

An endeavor is being made in New York to finance the Murray Mogridge property at Wolfe Lake, in the township of Maisonville. It has been reported that Mr. Jury may not be connected much longer with the company, and that the whole policy of the company may undergo a change.

Among the peculiar tactics employed for some unknown reason in the past has been the mailing of letters to certain shareholders, offering a fancy price for the shares, but with no replies coming back to those who expressed a wish to accept the offer. These offers did not come from company officials, but seemed to originate with private individuals, one in particular being quite active in Buffalo and sending the letters to stockholders resident in Canada.

The Murray-Mogridge property is one of considerable merit. Underground work has shown the presence of ore of good grade and across a good stoping width. The company, however, is in debt and seems to have received poor return for the $250,000 outlay to date. This is not attributable to lack of merit in the property itself.

The Mr. Jury spoken of as being identified with the proposition was a leading influence in connection with the West Comstock fiasco of some few years ago.

Deferred Assessment Work on Veterans' Claims

War Veterans who complained about alleged unjust operation of the Mines Act in regard to deferred installments of assessment work on their mining claims have the satisfaction of learning that the matter will be adjusted at once, and in time to prevent more than one installment of work falling due on July 1st.

The Cobalt branch of the G. W. V. A. took up the question and pointed out to the Minister of Mines for Ontario that several installments of work would fall due on these claims unless action could be taken before July 1st. The Minister replied as follows:

"I have for acknowledgement your favor of June 9th with reference to the extension of time to perform assessment work. This matter has received favorable consideration by the Department, and instructions will be sent to the various Mining Recorders in due course, directing them as to how they should deal with the subject matter of your letter."

This decision tends to remove considerable anxiety from among was veterans who are holding mining claims in this province.

Kerr Lake Dividend

Owing to successful operations in the state of Utah as well as on property owned in New Zealand, the Kerr Lake Mines, Ltd., will pay a dividend of 12½ cents a share on July 15th to stockholders of record at the close of business on July 1st.

Meanwhile, the company's property at Cobalt remains closed, the belief being that no effort will be made to resume production until such time as the cost of producing silver declines considerably or unless the quotations for silver advance substantially.

Spectacular Ore on Wright-Hargreaves

Following the announcement recently in these columns that exceedingly rich ore had been encountered in a stope in the east drift at the 400-ft. level of the Wright-Hargreaves, it has been learned that further stoping has proved the occurrence to be one of importance.

Some large specimens of this ore have been selected and will be sent to the Department of Mines, Toronto. These contain spectacular quantities of visible gold as well as a considerable quantity of gold tellurides.

Mining and milling is going on at normal rate, with production averaging well above $2,000 every twenty-four hours. Development work is progressing at normal rate, and arrangements are nearly completed for the commencement of aggressive lateral operations at the 700-ft. level.

Victory Silver Shaft

The shaft on the Victory Silver Mines has reached its objective at a depth of 475 feet, and the work of cutting a station from which to carry on lateral work is now under way. This cross-cut work at the 475-ft. level is intended to intersect veins which were found closer to surface and which showed excellent promise.

The fact that the present work is at a point close to the underlying contact tends to add greatly to the possibilities of finding ore shoots at that horizon.

McKinley-Darragh Mill

Operations at the McKinley-Darragh are settling down into a uniform stride. The mill is now handling an average of about 125 tons of ore daily, and the higher efficiency in all departments as a result of the improved labor supply already offers promise of reducing costs to a point where satisfactory profits will be made with silver at current quotations.

The amount of gold used for manufactures and the arts in the United States of America is very considerable, and has had a tendency to increase. During the years 1880 to 1920 the total consumption of new material has been no less than $897,374,855 in value or about an average of $21,887,191 per annum. From 24 millions in 1901, it rose to 42 millions in 1910, and in 1920 reached a total of $82,215,087.

During 1921, according to refiner's report to the United States Geological Survey, purchases of 847 ounces of crude platinum were made in California; 96 ounces in Oregon; and 78 ounces in Alaska. Purchases from foreign countries amounted to 56,654 ounces, of which only 1,286 came from Russia, and 63 ounces from Canada. The remainder was derived from Columbia, South America. Consumption of platinum in 1921 totalled 151,077 ounces. Two-thirds of this went to the jewelry trade, the next heaviest consumption being credited to the electrical industry, 20,574 ounces. Jewellers bought 59.55 per cent. of all the platinum, iridium and palladium sold.

Recent movements in the copper market are encouraging. Stocks on had in the United States are estimated at 400,000,000 pounds. Fully half this is marked for export. Copper sales last year totalled 1,700,000,000 pounds. It seems probable that the sales for the first four months of the current year will aggregate 1,000,000,000 pounds. It is predicted that the metal will sell at 15 cents before the end of June, and will reach me price of 6 cents before the beginning of September.

Germany purchased 26,360,000 pounds of copper in the United States during March. France was the second largest purchaser, with 10,227,000 pounds; Japan third with 8,848,000 pounds. Germany purchased more than double the amount bought by any other country during the nine months ending with March, and is rapidly approaching her pre-war status as an export customer.

EDITORIAL

By this Art of Refining and the Profit that accrews to it, many good and rich Mines have been discovered, which otherwise would have lain concealed: and by the Advantage of these Discoveries many Cities and Villages have been built, Lands have been improved in their Values, and People thereby increased and plentifully maintained.—Lazarus Erekern—1580.

CANADA'S BIRTHDAY

Last Saturday we celebrated our Dominion's fifty-fifth birthday. There are many now living who can remember the first Confederation day, when the unconnected British colonies of North America promised solemnly to become a unit within the British Empire. These fifty-five years have wrought a change that is beyond the vision even of those men of steadfast faith to whom the Act of Confederation was due. East and West have been brought together across a distance greater than ocean's width, and the barren plain between has become one of the world's granaries. The word *Canada* has come to signify, not merely a half of the North American continent, but the home of a young nation, as yet only partly conscious, elementary in its ideas, and unformed in its habits; but still (thanks to the late war) anxious and able to take its place among the nations. For the miner, these fifty-five years have meant the growth of his productiveness from a mere beginning in 1867, to a staple industry that today is becoming a serious rival to agriculture in its importance in our national economy.

These are a few of the great things accomplished during the past half century — mainly, be it noted, by the generation that is now handing over its burden to its successor. But not all the developments of that period offer us the same reasons for self congratulation. It is well to look at both sides of the picture.

Though we have now a budding national consciousness, we must not forget that its growth is as yet not at all robust, and its full bloom and fruition will be assured only if we tend and nurture it as its value deserves. The national interest is still subordinated, in large degree, to provincial and sectional interests; while personal interests at present exclude a view of the common weal to an extent that alarms many students of Canadian men and affairs. This immersion in our personal affairs, to the virtual exclusion of public duties, is so prevalent in Canada that our trans-Atlantic relatives commonly take it as typical of our country. The natural result is that Canada is today ruled to a great extent by demagogues and others of like tendency, whose interest is self centred, to the exclusion of the interests that they publicly profess.

Nor are our habits unimpeachable in the sphere of social existence. Our chief city has lately earned the reputation of being the pest house of the North American continent. The finger of scorn is being pointed at us by our southern neighbors with increasing regularity, and for just cause. Not until we make a united, national effort to control the illegal traffic in liquor and drugs, and other vicious tendencies for which our country is rapidly becoming notorious, can we consider ourselves on an equality with the citizens of the United States. They are at least making an honest attempt to "clean up" their country from coast to coast.

In the realm of finance, we have allowed, on a huge scale, a selfish manipulation of public and manufacturing services, of our natural resources and even of food-stuffs, that has made many millionaires, but has impoverished our country to a degree that we do not yet fully realize. Financial manipulators, still increasing in number, batten and grow fat on the bodies of those whose honest toil results in Canada's material well being.

In the sphere of mining we have much to be thankful for, yet much to fear. The interest in mining in Canada, which is fast becoming world-wide, has been accompanied by a breeding in our midst, as well as an importation from abroad, of a host of human leeches, whose mission in life it is to filch the earnings of honest workers. The growing display of advertisements of mining stock promotions in our daily newspapers and the avalanche of prospectuses delivered through the mails, are tangible evidences of this.

We have here presented, deliberately, the sombre side of the question, as an antidote to the self satisfaction and self congratulation that usually accompany and succeed the national birthday. If we are to have an ordered and logical development in Canada, in mining as in other departments of our national life, we must face all sides of each question squarely.

THE VERSATILE MINING ENGINEER

The rational training of an engineer consists mainly, now as always, in a thorough study of the fundamental sciences. The division of the student's time among the

various sciences, mathematical, experimental, and economic, is a prolific and ever-recurrent source of argument; but that these foundation studies should be concentrated upon instead of the innumerable specialized superstructures that can be raised upon them, is becoming more and more clearly recognized throughout the world of education.

Nowhere is the necessity for a firm grasp of fundamental principles more evident than in the mining engineering profession. No other engineer has such a diversity of problems with which to deal. This diversity not only lies in the choice of numerous widely different fields in which the mining engineer can cast his lot; but in the majority of cases his daily routine involves a wide range of occupation. A mining engineer can specialize in exploration, economic geology, underground operation, milling, construction of plants, mine management, or the marketing of mineral products; and each of these branches offers numerous sub-divisions, any of them of sufficient scope to employ the most energetic and able brain. On the other hand, the mining engineer in charge of a small property must be sufficiently proficient in all these various departments of his professional work to ensure him against serious error, thus to give his property a good fighting chance for profitable existence. It is to this latter qualification of the miner that our attention has lately been drawn by a striking example.

A number of years ago Canada's first promising China-clay deposit was opened up, and the natural conditions in which it occured were of such promise that a large amount of money was made available for its development. But things went wrong and most of this money was virtually thrown away on development and equipment that yielded a very meagre result. Expedients were adopted that had proved successful elsewhere, but failed to suit the present case. Experimental work was costly and unsuccessful. Those in charge had not a sufficiently clear grasp of the fundamental conditions involved. Their foundation work was poor, and their superstruction toppled over.

Eighteen months ago a mining engineer with good training, both scholastic and practical, was engaged in an attempt to retrieve the fortunes of this prospect. In viewing the property now, one can see, at first glance, little but the wreck of the former undertaking. But appearances are deceptive. The foundations of a successful mining enterprise are being laid, both wide and deep. By patient trial, a system of mining suitable to the ore-deposit has been evolved, and a comparatively large tonnage of ore has been blocked out. The bits of equipment inherited from the former managements have been pieced together, at little expense, and ordered so as to produce consistently a product of the first grade. A market more than sufficient for the present limited output has been developed, and satisfied customers ensure a steady market for the larger amounts that will be produced in the future. Simple devices for effecting economies have been evolved through the course of operating the present crude milling apparatus, and these will be installed as occasion warrants. The ore-bodies promise to be large, milling on a large scale will yield a handsome profit, and the establishment of a successful mining operation is in sight.

It is unnecessary to dilate upon the variety of problems with which this engineer has had to cope. He has had to deal with capitalists and labourers; with problems of mining and milling; with the provisioning and running of his camp; with the marketing of his product. It is to such men that credit is due for turning prospects, of merely speculative value, into the mines that provide an increasingly important fraction of the country's revenue. They seldom are accorded the credit they deserve.

BOLSHEVISTS IN NOVA SCOTIA

The recent meeting in Truro of the delegates of the coal miners of Nova Scotia, reported today by our correspondent (who earned his daily bread as a miner for many a year, and is in full sympathy with the miners' legitimate aims), shows clearly two things. It demonstrates the power of a demagogue over those untutored in the ways of the world, and it shows that this particular demagogue is so saturated with the doctrines of Lenine, Trotsky and Co., that he exudes Boshevism at every turn.

One cannot but admire the way in which Mr. Robert Baxter, the President of the United Mine Workers' organization in Nova Scotia, has taken the hot-headed and unthinking insults that have been heaped upon him by would-be social reformers at this meeting. Indeed, such men cannot insult a man such as Mr. Baxter. They may annoy him, and their agitation may even result in his being turned out of office; but he is superior to their attempts to insult, though he may be deeply hurt by the disloyalty to himself, their true leader, of so many of those miners whose cause he has made his own. We hope and trust that a majority, and a handsome majority, of the rank and file of the mine workers will come to their senses presently, and will discern the difference between real leader and demagogue.

Light and air kill most harmful germs, whose breeding place is normally amidst filth in dark corners. This fact, translated to human affairs, is, no doubt, the justification for the British custom of allowing free speech and open discussion under almost any circumstances. It is almost invariably the result, in such a case, that plenty of rope hangs the fractious calf. So we may infer that J. B. McLachlan, leader of the "Red" element among the Nova Scotian miners, will soon fade into the background of their affairs. He is now in the spot-light, and is doing a lot of strutting; but he has succeeded in making himself ridiculous in the eyes of most Canadians who have troubled to watch his antics, and we may expect that soon even his present followers will acquire grace to see him in his true light. Time is a great healer of such diseases as McLach-

ian is attempting to spread through the body politic of Nova Scotia and Canada.

We wish to refer, in this connection, to the warning and the protest that issued some months ago from some of those with intimate knowledge of the Nova Scotian coal miner—a protest that was printed in the *Canadian Mining Journal* on April 7th, under the caption "Tinkering with the wages dispute." Our Nova Scotian correspondent there pointed out that the chief result of the appointment of a second Conciliation Board would be a prolonging of unrest among the miners, who were then beginning to settle down to work in earnest. The result has justified this prediction. The Scott Conciliation Board showed a consideration for the miners' case that was more than just, and their findings included every concession to the miners that did not exclude the profitable operating of the coal mines. Yet the result is that the "Red" agitators, then almost on their last legs, have had a new lease of life, and are now prepared to carry further their ill-conceived Bolshevist propaganda. Still there is hope of a satisfactory settlement, and we may hope that Ottawa's ill-timed interference in a domestic quarrel will not have deranged seriously the affairs of the Nova Scotian coal industry.

EDITORIAL NOTES

We are pleased to notice that Toronto *Saturday Night*, the *Financial Post* and other weekly and daily papers are spreading broadcast the information contained in Mr. Alexander Gray's exposé of Canadian Associated Gold fields, published in these pages on June 2nd. Our own readers are more amused than informed by the recital of such an interesting example of how the public has been taken in. We appreciate the good offices of those papers and periodicals that have carried the information to a wider circle of readers, where its influence cannot but be of an educative nature.

We wish to draw attention to Mr. Denis' letter, printed to-day on another page, which refers to an editorial that appeared in the issue June 23rd. In contrasting the difficulties under which prospecting was carried on in Northern Quebec 15 years ago with the conditions to-day, we may have done an injustice to those that administered the old law. But the point of view expressed is fairly representative of that prevalent among prospectors at that time, some of which remains, without reason, to the present day. It is the favourable conditions under which prospecting can now be carried on in Quebec that we wish to emphasize.

It is indeed satisfactory to find that the coal and iron industry of Nova Scotia is at last coming back to its own. It has long been predicted that the advantages conferred by her natural resources, her population, and her maritime location would eventually cause Nova Scotia to rival Old Scotland as a centre of iron and steel production and of ship-building. The newly acquired export trade in semi-finished steel products in competition with any and all producers round the Atlantic seaboard augurs well for the future. It is here, some students of the subject say, that her chief profit will be made. The export of Wabana iron ore to Germany and of Nova Scotian coal to New England ports is satisfactory meantime, but seems to be due to a temporary disability of competitors more advantageously situated. It is Nova Scotia's inherent capacity to produce good steel at a low price that will eventually place her among the world's foremost producers in this Iron Age.

In response to our recent verse, "The Editor in Eruption", we have received the following from a

"SALES MANAGER IN ERUPTION"

My Dear Old Chap, I read your verse,
Bad as your case, it might be worse;
I take my pen in hand to scrawl,
I don't get any pay at all.

THE PROSPECTOR'S PRAYER

Oh Lord, let me find a "hootchite" * spring
Ere my span of life is o'er!
And I'll camp beside the blessed thing,
And roam the hills no more.

I'll build o'er the spring a little shack
With roses round the door,
And I'll promise the world, I'll ne'er go back
To combing the mountains for ore.

No more will I hump the hefty pack
While the sweat runs in my eyes,
I'll lie in the shade in my little shack
And guard my precious prize.

When pilgrims flock to my boozy shrine,
I'll cheerfully turn the tap,
And let them throw, for the juice benign,
Their treasure in my lap.

Thus life for me will onward roll,
"One grand sweet song," I think,
Slaking the thirst of the drouthy soul
at fifty cents a drink.

Then, too, I'd be "esteemed by all,"
As my pile grew wide and high,
But surer still would be my fall
If my precious spring went dry!

Donald C. Simpson

* "Hootchite" is a new mineral, said to run high in alcohol reported by the late "Mining and Scientific Press" as a recent find in Nevada.

Wilfred A. Fairchild, M. E., Married in England

An Aeroplane Wedding With a Northern Ontario Flavour

Northern Ontario is an extraordinary country, breeding unusual things — big mines, big forests, many lakes, big snows, strong cold, big black flies, great big mosquitoes with great big appetites, and as a natural result of all these big things, unusual men who do things in an unusual way.

I returned last week from a short visit to the prosaic little island containing England, Scotland and Wales, and whilst engulfed in the archaic atmosphere of Old World national and international squabbles, stumbled across an approaching event doubtless of much interest to Cobalters, Porcupiners and Northern Ontarians in general.

Unfortunately my boat sailed four days before the culmination of the event and I certainly would have liked to have been in at the finish.

On June 1st, "Fred" Fairchild, only recently out of the bush, ostensibly for a holiday in the Old Country, was married to Miss Helen Spensley of Australia. The wedding took place at Westoning Manor, the palatial country seat of the bride's cousin in Bedfordshire. It was no ordinary wedding either, for Fred Fairchild is first and last a Northern Ontarian, whose old bald head has offered many a delectable meal to big mosquitoes with great big appetites. Incidentally, Fred had only recently come out from an oil-hunt in the Mackenzie, and the lavish — (but I might be giving secrets away — anyhow everyone knows what oil is these days, and Fred always said he would never marry unless he made a million of something or other.)

Anyway, Fred was not going to be married in an ordinary way, for he was a Northern Ontarioite, recently a Mackenzieite, and his ideas savoured of mosquitoes and oil — large mosquitoes and much oil.

We discussed the prospective arrangements over a sparkling icy whiskey and soda (yes, hang out your tongues, ye dry ones) in the luxurious lounge of the New Metropole. The dreamy strains of a "Love" waltz floated through the air from the distant orchestra. The setting was just right for the discussion of wedding arrangements, and after about the third whiskey and soda poor old Fred looked hopelessly, terribly, miserably love-sick, — Imagine it!!

I made several wedding suggestions, but Fred would have none of them.

"No!" he said at last, "I want to give this thing a Northern Ontario flavour — something to startle the natives! Am I not an Oil and Mosquito King!?" and he gulped another mouthful from his sparkling glass.

"Frankly, Fred," I said, "I don't see how you can bring mosquitoes and oil into a wedding, — gold, silver, cobalt, nickel or dynamite if you like. ..... but mosquitoes and oil ..... for the love of Mike, man!!"

He seemed crestfallen and with those love-sick eyes stared blankly into space. Then suddenly his eyes flashed fire and assumed their normal expression of enthusiasm. I followed the direction of his gaze. There on an artistic placard was written "The Mosquito Fleet of Commerce".

"I've got it!!" he ejaculated with a roar, "Areoplanes!! The nearest thing in this country to a Northern Ontario mosquito!! The blackguards have bitten me to death — eaten all the hair of my head, and now I'm going to make 'em fly with me and my girl!!" He drained his glass with one vicious gulp and flew for the aeroplane office.

Right then and there a special aeroplane was chartered to be at the parish church door in the sleepy little Bedfordshire village at 12.30 p. m. on June 1st, and the cold, hard cash paid down. The landing spot was to be marked by a large sheet. To the tune of the wedding march, Mr. and Mrs. Wilfred A. Fairchild would step into the gigantic mosquito and, clasped in each others arms (just think of it!) be wafted off to Paris on the first leg of their honeymoon. Where they will fly from there the Lord only knows. Probably by this time the happy couple are perched on top of the Pyramid of Gizah in the grand isolation of a desert sunset.

"But what about the oil?" I asked Fred timidly. "Why, you silly ass" old Fred replied in true London lingo "that's what that blamed mosquito will eat all the way to Hellangone!"

"Umm umm!" I said, much enlightened.

"And then, besides, I'm going to christen that bug 'Dome' with a bottle of Mackenzie oil before we step into it!"

I suppose he was thinking of his old mosquito-scarred pate . . . . . or was it perhaps a mine?

This thing perhaps has had a sequel; that is why I surely would have liked to have seen the finish.

At a little reunion in the Metropole the night before I sailed, at which were Dougherty (formerly of Dickson and Dougherty, assayers, Porcupine), Alex Grundel and Dick Shone (the original stakers of the Keely), a plot was hatched to place a huge sheet in front of another church from which would emerge Mr. and Mrs. Dick Shone, who would fly over to Paris for afternoon tea.

By jingo! I would like to have seen the finish!

Anyhow, I am sure we all wish Mr. and Mrs. Wilfred Fairchild the very best of luck and happiness for all time. We will all miss Fred Fairchild in this country, and I am sure the mosquitoes will.

J. T. M.

COAL STATISTICS FOR MARCH

The *Coal Statistics for Canada, March,* 1922, are now available from the Dominion Bureau of Statistics, Ottawa. The total production for the Dominion was 1,400,000 tons, which was 107,000 tons more than in February. The imports were, 1,615,000 tons, which was 615,000 tons more than the preceding month. The exports amounted to 174,000 tons.

Output of Coal by Provinces in Short Tons.

	March 1922	Feb. 1922
Alberta	618,000	634,000
Nova Scotia	434,000	344,000
British Columbia	302,000	262,000
Saskatchewan	30,000	35,000
New Brunswick	16,000	18,000
Total for Canada	1,400,000	1,293,000

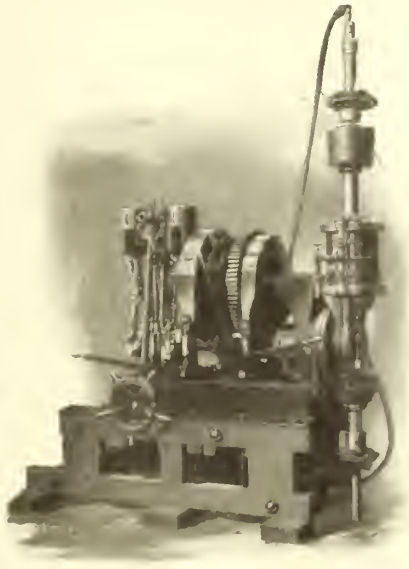
The Diamond Drill for Oil Wells*

By FRANK A. EDSON

The drilling of a 1,200-bbl. well by the use of the diamond drill, accompanied by the securing of some 80 per cent of core and a substantial saving in drilling costs, has been a matter of considerable comment among both operators and geologists. Since the work was done under the actual direction of the writer, he has thought that an account of the operation would be of interest both to members of the association and to oil men in general.

The well was drilled for the Panuco-Boston Oil Co., a subsidiary of the Atlantic Refining Co. It was located on the Ugarde lease in the Panuco district of Mexico,

The Drill used



about 40 kilometers from Tampico. The formation is similar to that found elsewhere in the district. There is about 200 feet of surface soil, mainly river wash which contains some boulders. Underneath this there are about 1,200 feet of shales, presumably Mendez, underlaid by some 700 or 800 feet of the shaly limestone of the San Felipe series. This lies directly upon the Tamisapa limestone, which, however, was not penetrated by the drill as the production was found before this formation was reached. Judged from a drilling standpoint the upper 1,400 feet is good rotary ground, although it can be drilled with cable tools. Below this depth the ground is much better for standard than for rotary tools.

The upper part of the formation, down to 1,407 feet, was drilled by attaching a fish tail bit directly to the diamond drill rods by a special "sub" or bushing, and operating as an ordinary rotary. The customary mud-laden fluid was used, an ordinary mud pump being employed for this purpose. The main points of difference between the rotary and the diamond drill in this part of the work was the manner in which the drill stem was rotated, and the way in which it was held in suspension.

The drill stem, or "rods," as they are called in diamond drilling, is directly connected to the engine by bevel gearing very similar in type to that used in the modern gear-driven rotary. The effect is to give a higher speed of rotation to the bit, the diamond drill ordinarily running from 200 to 400 revolutions per minute, while the rotary normally averages between 60 and 100 revolutions per minute. This higher speed must generate greater centrifugal force, which slaps the mud against the side of the wall somewhat harder than does the ordinary rotary. This is a point which it is probably impossible to actually demonstrate, but rotary drillers with whom the writer has discussed the matter all agree in thinking this to be of practical benefit to the hole.

The drill stem is made up of flush-jointed steel rods, which are of uniform outside diameter. These rods are passed through a chuck, which, while being free to revolve, is attached to a hydraulic cylinder. This cylinder moves vertically, either upward or downward, carrying the rods with it. In effect it is a hydraulic jack which carries the weight of the rods and yet allows them to revolve freely. As the water is allowed to escape from the under side of the hydraulic piston the drill stem moves gradually downwards, or, if the direction of the flow in the cylinder is reversed, it moves upward. The escape of the water is controlled by a valve and is capable of a very fine adjustment. This method allows the driller both a more positive and a more delicate control of the movement of the drill stem than is enjoyed by a rotary driller. This was well illustrated by a fishing job which took place at 2,100 feet. At that depth the top of the core-barrel, which had been obtained locally and contained defective material, twisted off. A screw tap was attached to the rods, and the engine was revolved at the slowest possible speed, while the driller fed the drill stem down so delicately that it entered at the proper speed to firmly thread its way into the inside of the core-barrel. Incidentally the entire operation only took a little over seven hours.

This absolute control of the movement of the drill stem enabled the drill to go through gumbo without "balling up." The secret is to feed the bit down evenly and slowly so that it cuts the ground a little more slowly than the pump can take it away. If this is properly done there is little danger of a ball up for there are no

The drilling rig

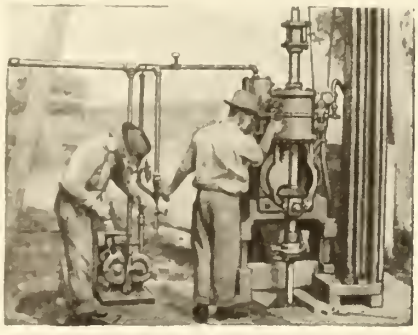
* For the above interesting article we are indebted to the Sullivan Machinery Company.

cuttings there to ball up. The value of being able to go through soft ground without being troubled in this way is hard to overestimate.

The cuttings were much finer than those obtained from ordinary rotary drilling. Probably 80 per cent. would go through a 50-mesh sieve. This is probably due both to the higher speed and more even feed of the diamond drill. Finer cuttings undoubtedly work farther back into porous strata and thus mud up the hole better. On the other hand they do not afford as much information to either the geologist or the driller. Mr. Elledge, the geologist for the Panuco-Boston, complained that when he washed the samples he had nothing left. When the diamond drill uses the fish-tail bit the log will be even less reliable than the ordinary rotary log because of this fact.

The hole was cased with three lines of casing. For surface conductor 223 feet of 7⅝ inches pipe was used. Inside of this was placed 548 feet of 6-inch pipe, while the final string was 1,407 feet of 4-inch pipe. The casing was all of the ordinary type, no flush-joint being used. The 6-inch pipe was an unnecessary precaution taken because this was the first hole ever drilled in this way. It is being omitted on succeeding holes. The 4-inch pipe was cemented into the lime in the ordinary way by the use of a top and bottom plug. The cementing was done in accordance with the Mexican Government regulations, and under its supervision. It is required on all wells drilled in the high pressure area. In conformity with these regulations the cement was allowed to set 10 days before being drilled out.

On derrick floor using diamond drill



In the upper part of the hole difficulty was encountered because the drill stem, 2⅜ inches in outside diameter, was too small for the large size hole which the drill was then making. The side play of the stem caused frequent breakages. This was temporarily remedied by using 4-inch rotary drill stem with only enough diamond drill rods to make the connection through the hydraulic cylinder. Drill stem of a diameter of 3½ inches had been ordered from the manufacturers, but had not arrived at the time the writer left Panuco.

Diamond drill rods are ordinarily unscrewed by hand, using a 36" pipe wrench, and the machine was not equipped with mechanical means of breaking joints. This slowed up the operation of coming out or going into the hole, as breaking apart rotary tool-joints by hand is a slow and laborious process. Also the drilling was, perhaps, slowed up somewhat by the fact that the downward pressure of the hydraulic could not be used on the drill stem without danger of breaking it. This, of course, would only apply to the upper part of the hole. No records were broken so far as an individual day's run was concerned. The average cutting speed with the fish-tail bit was from 10 to 18 feet per hour, depending upon the formation it was working in. It is probable that, with the use of the proper drill stem and the greater familiarity of the crew with the operation, a speed of from 150 to 200 feet per day can be averaged.

After drilling out the cement, work was carried on by the aid of a diamond bit. A 3 5-8 inch bit, which cuts a 3-inch core, was used. None of the holes in the Panuco district are cased below the top of the lime, so it was unnecessary to carry a larger hole.

A 13-foot core-barrel was used, which necessitated coming out of the hole several times a day. An average speed of approximately 75 feet per day was maintained down to 1,850 feet, where enough oil was struck to fill the hole. From there down to 2,153 feet, where the hole was bottomed, the drill averaged between 35 and 40 feet per day. The former average was somewhat above the average of cable tools in this district, while they can only make from 8 to 10 feet per day when drilling in a hole full of oil. Lest the Panuco cable tool driller be unjustly criticised, it should be remembered that Panuco crude is of about the consistency of molasses and very effectually cushions the blow of the bit. The total time spent in drilling the well, including all delays, was less than 90 days. The writer is informed by statisticians that the average time for the Panuco Field is five months.

A cutting speed of approximately 10 feet per hour was made by the diamond bit. The loss of speed came from the time required in coming out and going back into the hole. At 1,500 feet it took about 45 minutes to come out and about 35 minutes to go into the hole. When the hole was full of oil it took nearly two hours to pull out and about the same length of time to go in. A 64-foot steel derrick was used, which allowed the rods to be pulled in 50-foot lengths. The speed of the drill is governed more by the number of times it is neeessary to pull out, and by the length of time required for this operation, than by any other factor. The number of times it is necessary to pull out is governed largely by the length of the core-barrel. A 30-foot one is to be used on the next hole, and it is very probable that an average speed of between 100 and 125 feet per day will be maintained.

Considerable doubt was expressed as to whether or not the drill would operate satisfactorily when the hole was full of oil, and if the drill stem might not be blown out of the hole when the high pressure was encountered. The oil in the hole seemed to act as a lubricant on the rods, and, if anything, the drill worked more smoothly. On the other hand, while an oil saver was used when the drill was running, it had to be removed to take the core-barrel out and the derrick and floor became so covered with oil that it was almost impossible for the men to keep their footing. This was the main reason why not over 40 feet per day was made in the last of the drilling, as the cutting speed of the bit was approximately the same as before.

The high pressure gave no particular trouble except that the last 500 or 600 feet of drill stem had to be snubbed out of the hole with a manila rope. It was unnecessary to use the stronger and more elaborate apparatus which had been provided for this purpose. While not over 750 pounds of pressure was encountered the writer has no hesitancy in stating that three or four times this amount could have been satisfactorily handled. The secret is never to let the well get away from you.

To the surprise of every one about 85 per cent of core was obtained. This was due both to the large size of the core and to the flat bedding of the rocks. Probably no one feature of the drilling attracted as much attention as the core. It was a new and satisfactory experiment to both operators and geologists to be able to see and handle the rocks which were actually producing the oil.

Some times the gas could be seen bubbling out of the core. Many of the cores contained fractures which, when broken open, were found to contain drops of oil. As the drill reached greater depths the fractures contained more and more oil, until at about 1,850 feet they began to give actual production. The well came in rather gradually from that point, until at 2,153 feet enough oil was struck to bring the production up to 1,200 lbs.

It was observed that these fractures occurred in zones. The drill would penetrate 20 or 30 feet of fractured ground and then go back into solid rock again. This would continue for 50 or 60 feet and then another fractured zone would be encountered. This information would have been very important had it been desirable to shoot the well. The shooter would have known, almost to the inch, just where to put the shot, as he could have judged much more accurately as to the amount of explosive required. In general it is hard to overestimate the practical value of the information to be obtained from such cores. The ordinary practical oil operator can obtain more information from them than the trained geologist does now from a microscopic study of well cuttings.

Use of Sullivan double tube core barrel

Doubt was also expressed as to whether or not the 1 inch pipe would be large enough to accomodate the oil. As stated above, the well came in with 1,200 bbls., but the oil coming out of the pipe did not fill more than one tenth of its area. There may be occasional wells so large that a 4 inch pipe really will not accomodate the oil, but they are few and far between.

An interesting discovery was the fact that the ordinary mud laden fluid which is used by the rotary can also be used with a diamond bit. It has generally been thought that the latter would require clear water, but about a 20 per cent mud solution was used in this hole with satisfactory results. It is probable that even thicker mud could be used if larger waterways were cut in the bit. The fact that mud can be used with a diamond bit makes it possible to drill in caving formations, recover the core, and at the same time hold up the sides of the hole with mud. This makes the diamond drill practicable for softer ground than has been thought before. Just what the limits are in this respect remain to be worked out.

An equally welcome discovery was the fact that a very considerable saving was made in costs. The well was completed for less than 60 per cent. of the current contract price in the field. This figure covers the complete cost, fuel, water, casing, rig, labor and diamond wear (which amounted to less than one cent per foot), all being included—a "turn-key job" in other words. It should also be remembered that neither the writer nor any of the drillers had ever worked in the Panuco Field before, and that the well was, therefore, to all intents and purposes, a wildcat to them. The writer has no hesitation in stating that as the men become more familiar with the work and develop the technique required in this field the costs will be cut to less than 50 per cent of those of drilling by ordinary methods.

It should be noted that the well was cored all the way through the lime. Had the plugged bit, which is solid and takes no core, been used it is probable that an even greater cut would have been made in the cost of this well. The writer has talked with drillers who have worked in both the Panuco and the Mid Continent Fields. They unite in stating that the rocks in Panuco drill about the same as the average rocks of the Mid Continent. He is, therefore, inclined to believe that a very substantial saving can be made in drill costs in the latter fields as well as in Mexico.

The writer also had charge of a drill in the Southern Fields which was doing structure drilling. This outfit had just gotten nicely started when he left Mexico, but one observation was made which is of importance in the Mid Continent. The drill was operating in the upper part of the Alazan shales, which are fully as soft as the ordinary rotary ground in this country. Men who have operated in both places say they are about equivalent to the softer portions of the Redbeds.

Yet by taking certain precautions over 95 per cent of core was obtained with a single-tube core barrel. From this experience it is believed that no great difficulty will be encountered in obtaining cores from either the softer shales or sands of the Mid Continent fields.

NOVA SCOTIA COAL IMPORTS

The first cargo of coal to be received at this port in 20 years from Nova Scotia mines arrived at Providence, R.I., last Saturday in the United States Shipping Board Steamer *Bethlehem*, totaling 3,600 tons, and consigned to the New York, New Haven and Hartford R.R. from Sydney, N.S. It is regarded as good quality bituminous and is admitted free of duty. The last coal from Nova Scotia came to New England during the winter of 1902-1903 when there was a shortage of domestic coal. Other cargoes will follow. It is reported that the New Haven fuel reserve is well stocked, following the receipt of two cargoes of coal from Charleston, S.C., the past 10 days, in addition to the Canadian coal.—*Seaward's Journal*, June 24.

PROSPECTS IN BRUCE TOWNSHIP NORTHERN ONTARIO

On the George Borgford claim (lot 9, con. II, Bruce twp.) a test pit is being sunk on a gold-bearing vein. The gold occurs with quartz and pyrite in narrow rusty shear zones in andesite rock of Keewatin age.

On the Quesnel claim, to the northeast in lot 1 con. IV of Bruce twp. trending easterly and westerly, a quartz vein two feet wide in andesite and porphyry of the Keewatin series, has been uncovered for the gold content of the vein is not yet known.

The Relationship Between Mining and the other Industries in Canada

A STATEMENT PRESENTED TO THE ANNUAL MEETING OF THE ONTARIO MINING ASSOCIATION IN PORCUPINE ON JULY 6th. BY THE SECRETARY, B. NEILLY

What do the people of this Province as a whole obtain by reason of the Mining industry? This is a question familiar to practically every member of this Association. Through the press the public is informed concerning the direct and apparent benefits, such as dividends paid by mining companies, the amount of revenue derived by the Government from the industry, and the part played by mining in opening up and developing the North. But to the hard-headed business man of Old Ontario, the information available has been incomplete and in some cases inconclusive. He comes back with the question "What do *I*, having no investment in mines, gain by reason of the Mining industry?"

The following figures have been prepared with a view to answering the last question.

The value of the gross production for 1920, the amount paid in dividends, for Compensation Insurance and wages, have been taken from Government reports. The $6,000,000 set up to cover increase on surplus accounts and profits made by non-metallic mines, may be accepted as reasonably correct.

To arrive at the percentage distribution of funds spent for mining supplies, the disbursements of a North Country gold-producing mine, were taken as the basis. It is of course apparent that the conditions at no one mine can properly be taken to represent all the mines. Had a Sudbury Nickel mine been taken as a basis, the freight and fuel expenditure would have been proportionately much higher. Had we taken a mine increasing its capacity and equipment during the period, equipment cost and customs duties would have increased. This then is an estimate, based upon the data available, and it is hoped sufficiently correct to indicate the market possibilities arising out of the development of the Mining industry.

To estimate the final distribution of wages, no better basis could be found than that upon which the Family Budget is estimated by the Department of Labour at Ottawa. The cost of food, fuel and rent has been taken as representing two-thirds of the expenditure of the average family of five, and the remaining one-third as covering cost of boots and shoes, clothing and incidentals.

Table II

SUPPLIES, ETC., PURCHASED IN 1920 $30,492,249

This amount was distributed, approximately as follows:—

For			
Ball Mill Liners, Castings and Machine Shop Work	13.00%	equals	3,963,993
Customs Duties	1.00%	"	304,923
Chemicals & Apparatus	9.36%	"	2,854,074
Coal	4.34%	"	1,323,363
Drill Steel	1.65%	"	503,122
Express	.95%	"	289,676
Equipment	6.45%	"	1,966,750
Explosives	11.95%	"	3,643,824
Electrical Supplies	1.53%	"	466,531
Freight	8.21%	"	2,503,414
Hardware	4.58%	"	1,396,545
Insurance - fire	3.27%	"	997,097
Lumber	4.33%	"	1,320,314
Legal Expenses	.57%	"	173,806
Machine Drills & Parts	2.27%	"	692,174
Oil	1.08%	"	329,316
Power	18.95%	"	5,778,281
Pebbles	.93%	"	283,578
Rubber Goods	.48%	"	146,363
Stationary & Office Supplies	.63%	"	192,101
Telephone & Telegraph	.43%	"	131,117
Incidental Expenses	4.04%	"	1,231,887
			$30,492,249

Table I
1920

Gross value of metallic production		$48,281,553	
Gross value of non-metallic		24,795,194	
Gross value of mineral production in 1920			73,076,747
Dividends Paid			
Gold Mines	3,256,928		
Silver Mines	4,067,242		
Nickel Mines	1,910,800	9,234,970	
Taxes Paid			
Ontario (including share of municipalities)	370,667		
Dominion	878,772	1,249,939	
Compensation Insurance paid		335,628	10,820,307
Balance			62,256,710
Deduct amount estimated to surplus account of the metallic mines and profit earned and taxes paid by non-metallic mines			6,000,000
Amount remaining for compensation of labour and purchase of supplies, etc			56,256,710
Amount actually provided for wages			25,764,461
Amount provided for supplies, etc.			$30,492,249

Rent in this list, taken at approximately $25.00 per month per man, and railway fare introduced largely to take care of street-car fare in urban districts, are manifestly in excess of the amount spent by the average miner. His actual saving on these two items, added to the amount his average earnings exceed the cost of the Family Budget, represents savings.

Table III

GROSS WAGES PAID BY MINING INDUSTRY IN ONTARIO 1920 . . . . $25,761,461

Meats	11.19%	$2,883,043
Dairy Produce	12.79%	3,295,275
Flour, Bread, Rolled Oats, Beans	7.27%	1,873,076
Sugar	2.98%	767,781
Fruit	1.43%	368,432
Tea	.85%	218,998
Coffee	.39%	100,481
Vegetables	3.39%	873,415
Incidental Groceries	.87%	224,151
Fuel & Lighting	9.41%	2,424,436
Rent	16.09%	4,145,502
Boots & Shoes	2.86%	736,863
Clothing	11.43%	2,944,878
House Furnishings	2.86%	736,864
Railway Fare	2.86%	736,861
Health, Doctor and Dentist	4.76%	1,226,388
Insurance	2.38%	613,194
Charity, Church, etc.	2.38%	613,191
Newspapers & Education	1.43%	368,432
Sundry	2.38%	613,194
	100.00%	$25,764,461

The above figures show, then, approximately the market provided by Ontario's Mining Industry for the benefit of the producer and manufacturer of Old Ontario.

As a comparison it might be added that the 56 million-odd thus disbursed in 1920, exceeded the gross value of all Canada's exports during the same period, to the following countries:—

Brazil,	Cuba,	Columbia,
Costa Rica,	Chile,	Guatemala,
Honduras,	Mexico,	Peru,
Dutch Guiana,	Nicaragua,	Panama,
Dutch East Indies,	San Domingo,	Hawaii,
Philipines,	Porto Rico,	Uruguay,
Veneznela,	Bermuda,	Ceylon,
British India,	British Guiana,	Barbados,
Trinidad,	British Honduras,	Australia
Fiji Island,	Jamaica,	New Zealand,
	Straits Settlements,	

MINING OPERATIONS IN THE PROVINCE OF QUEBEC DURING THE YEAR 1921

The Annual Report of the Quebec Bureau of Mines is now available to the public.

Last year's mineral production had an estimated value of $15,522,988, as compared with $28,392,939 for the year 1920, a very serious drop indeed, but not necessarily discouraging when the facts are considered. The general depression in trade and commerce hit Quebec's asbestos industry hard. From $14,750,000, the value in 1920, the asbestos produced in 1921 fell to $5,200,000. Chromite dropped from $247,730, the value of production in 1920, to $22,696 in 1921; magnesite from $512,755 to $71,110, copper ore, from $98,854 to $10,463, and so on through the list with the notable exception of feldspar, the production of which represented $11,252 in 1920, and $79,752, last year. The increase was largely due to shipments from the O'Brien and Fowler quarry in the Buckingham district. The deposit here worked is one of great promise.

Asbestos. Quebec's pre-eminence in the asbestos market is not yet seriously challenged, although a cloud the size of a man's hand appears in the horizon. Of the asbestos imported into the United States, our chief markets, the province produced 65,700 tons in 1921, the rest of the world producing 940 tons, of which 449 tons are credited to South Africa. Of a total estimated value of $2,949,662, Quebec contributed $2,588,799. It is pointed out that actually 877 tons represents South Africa's output, shipments being made from ports not in the Union and the origin of these shipments being erroneously attributed to other countries.

The Report contains a timely review of the asbestos situation, along with useful information as to grading and uses, and a summary of the world's total output.

Copper. The Weedon Mining Company was the only shipper during the year. It was operated for three months only.

Chromite also was shipped from only one property, that of the J. V. Bélanger Mining Company, Coleraine district. The shipments wer consigned to the United States Ferro Alloys Corporation, which Company has now acquired the property. Two other mines were dismantled.

Molybdenite ore was not produced during the year, but renewed activity is expected.

Zinc and Lead.—The Tetreault mine, at Notre Dame des Anges, was the only shipper. 778 tons of lead concentrate were produced, valued at $18,080.27. No zinc concentrate was shipped. The mine was operated for only three months. At the mine of the Fereral Zinc and Lead Co., Limited, Gaspé, only development work was done. A large amount of high grade ore is blocked out in this mine and road construction is being carried on.

Gold was produced only as a by product of copper sulphur ore. Strange to relate, Quebec has yet no gold mining industry, though many a prospect pleases. This is not as it should be. There are no intrinsic reasons why Quebec should not be a substantial producer of gold. Systematic prospecting is needed. Why the prospector hangs back is something that invites enquiry.

Silver also is a by product.

Titaniferous iron ore received no attention during the year. The Quebec deposits, in view of recent metallurgical developments, deserve serious examination.

Magnesite. Three companies produced magnesite, the total output being about 5,000 tons. This is one of the minerals the working of which will be most adversely affected should the proposed United States tariff be adopted.

Mica production fell to its lowest recorded figure, and no *Graphite* shipments were made.

Feldspar, as mentioned above, was produced in much larger amounts than in 1920.

A small tonnage of *Iron Ochre* was shipped.

The rumour of the discovery of rich oil shales in the Township of Port Daniel turned out to be unfounded.

Amongst building materials, sand and limestones showed increased activity.

A useful feature of the Quebec Annual Report is a list of mines and quarries.

News and Comments

BY ALEXANDER GRAY

Yea, Verily, Brother!

The Scripture moveth some of us to moralize a bit about the following leading editorial in THE MONTREAL DAILY STAR of June 23:

LOOK OUT FOR SHARKS

Important mineral discoveries in any country offer a luring temptation to adventurous exploiters to offer for public subscription all sort of properties with glowing prospectuses, often misleading, often valueless and frequently fraudulent.

The bankruptcy of a prominent brokerage firm in this city proved the concern to have been loaded with the worthless scrip of oil and gold projects. For every genuine gold mine and for every genuine oil well there are scores of fake enterprises foisted on a guileless public.

In times when ordinary business is quiet these fake enterprises are often most prosperous because many well meaning persons, seeking something to offset business losses, are more prone to speculate and all the more easily gulled.

Those subject to this kind of temptation should make no investment in such enterprises without enquiry of their bankers or other financial authorities of good repute. "*Look out for sharks*" should be posted in every man's brain.

When this appears in the newspaper with the largest circulation, a newspaper with the power to beneficially educate the public in these matters, it is fervently hoped to "have a little more of the same, thank you", from that source. Putting "sharks" where they belong is a work in which THE STAR can greatly aid, even though Business Offices do not take kindly to the refusal of display advertising. The "temptation" is not confined to the gullibles in the Street; hence the editorial quoted suggests that newspapers, too, are remiss in failing to consult "bankers or other authorities of good repute", before lending their influential advertising columns to overstatements and mis-statements. Granting the difficulty of censorships in the circumstances, knowing THE STAR Staff to have no purpose other than to conserve confidence (and cash—petty cash, if you will—it is an established fact "sharks" are not so much concerned with editorial utterances so long as they have their advertising broadcasted and "every man's brain" is in a whirl lest it be too late to get shares of problematic value.

"Snaring the Great Uncaught", has become a popular pastime—and it is worth as much space as is devoted to other amusements-de-luxe. Mining Scientists seek the co-operation of newspapers like THE STAR in order to minimize the number of "fake enterprises" foisted "on a guileless public". Every prospect deserving consideration is entitled to funds. Syndicates or small companies, perhaps, should undertake initial work, instead of the almost interminable, and certainly insufferable, issues of script which make of so many half-baked concerns, "steam shovel propositions"—when it comes to shift the script. Closer organization would make it possible to suitably reward the prospector who accepts shares, in whole or in part payment, when a property discloses its merits; whereas in most instances neither the public nor the prospector with Vendor Script has a chance. "Look out for sharks" ought to be repeated in THE STAR—kept standing, as it were. Brave words those:

> "*All sorts of properties with glowing prospectuses, often misleading, often valueless and frequently fraudulent*".

To illustrate: The other day I ran into a speculator from over the border, who seemed to be busy. His explanation was: "At last I have the right 'dope'. I've been playing the market, and been a buyer until they took all I had. Now I'm a seller. I came to Montreal to sell an oil stock, and we can't hardly print the certificates fast enough. I'm even on the market. Me for the selling end of it hereafter". But the pioneer invariably is sold. Public confidence is sacrificed, and Canada loses more—infinitely more—than the mere money.

My reading of THE CANADIAN MINING JOURNAL policy is that it will promote every legitimate project, and the welfare of mining scientists. Too many mountebanks ceremoniously submerge prospects or more advanced propositions in "water", to depths beyond which deep-sea divers will not penetrate, knowing they never can "come up for air". Valuing outcrops and preliminary workings by the ream is no less reprehensible than by fathoms—of "water". The public should not be asked to take all the risk, the mining professions ought not to associate with perverts. A happier medium for obtaining working capital, and a polite refusal of the lay press to allow promoters to "put it over", will clarify the atmosphere. Daily newspapers cannot claim immunity by default.

Abandon Elbow Lake

In forecasting the abandonment by individual Hollinger officials of their options on Elbow Lake properties, the intention was to prevent the distribution of shares by other interests not so well and fully advised in the premises. Possibly the decision reached by President Noah A. Timmins and General Manager A. F. Brigham, after visiting the Manitoban fields, may not mean that other portions are unattractive for large operations. The Exploration Company of London, Tonopah Mining Company, Mining Corporation of Canada, McIntyre Company of Porcupine and Nipissing Company of Cobalt, each and all are capable of deciding for themselves. They have not made any extravagant claims, such as emanated from Elbow Lake Mines Corporation selling agencies. Attempts to build a public interest on the strength of Hollinger participation were inevitable, ill-advised as it was to involve the whole situation in a condemnation by the Hollinger people alone. If, as is alleged, several interests have shared the experience of the field force representing the Timmins party, then Elbow Lake needs more than oxygen to keep it alive. To have spectacular showings, too evanescent after being moyled, and to find that the bespanglings are only "skin deep", prompted the withdrawal of the so-called Hollinger staff and crew. It was suggested that diamond drilling might be more conclusive as a means of determination. Others may resort to that method. President Timmins has shown he possessed prevision; and he may be said to have the Midas

touch; yet the Elbow Lake situation to his judgment did not offer the opportunity for all he and his colleagues were prepared to provide. However, Hollinger standards may not govern throughout. The chief owners of Porcupine mines that are unique in popular estimate are chary about lending their prestige to anything that may not be strictly "kosher".

Kirkland Lake Proprietary Clean-Up.

As no such Kirkland Lake Proprietary details have been officially communicated to Canada, this item as it appears in London, is interesting:

"First clean-up to May 24 approximately $19,000 from 2,040 tons. Main lode intersected at fifth level. Burnside Vein looking very promising. No. 11 vein cut at fourth level Tough-Oakes. Both veins now being driven on".

The date of the cable was June 6. The average of the tonnage treated, is shown to have been $9.31 per ton, which should be bettered as development proceeds. By solving the faulted section and locating the vein system to the east of the north-and-south fault, it is hoped the present capable management will have all the financial assistance necessary to prosecute the development the properties need. The cards seem to be in the deck—it is for the players to use them to the best advantage. In this connection Mr. Keegan of THE FINANCIER, London, who recently toured the Ontario North Country, and who evidently had a special commission and enjoyed special facilities for obtaining information regarding London-owned or controlled properties, had the following:

"The old owners of the Tough-Oakes and Burnside properties, after picking the mines, suspended operations. It has been left to the new proprietors to pursue, with the most encouraging results and under the direction of the most skilled advisers, an energetic programme of exploration and development.

"Crushings have just been resumed, and the company bids fair to become in the early future what it was in the past history of the camp, by far the largest producer of gold in the Kirkland Lake area".

Having "passed the buck" to those who "picked" those mines and left them speechless and unsightly, it is gratifying to have Mr. Keegan, an Eye Witness that cannot be impeached without infracting the rule of evidence—assure interested and "innocent by standers" that all is well. To a certainty the Tough-Oakes, Burnside and Sylvanite can do team-work that should bear out Mr. Keegan's forecast. But Mr Keegan must not hold London blameless for that "picking". It was an international "mandate"

Mr Sifton Sold too Soon

The "boom" days of Montreal River areas were twenty four hour in duration altogether too short for prospectors and promoters. Senator O'Brien and the Honorable Mr. Sifton on joint account invested in Miller Lake claims, the Bousall, Gates, etc. They paid cash, and it was presumed they were well advised. Somehow they were unsuccessful. Senator O'Brien took up other ground on personal account, and the Miller Lake O'Brien has entirely justified his sporting spirit. Not so long ago, Messrs O'Brien and Sifton had a heart to heart chat, which resulted in Mr. Sifton disposing of his interest. Then (and this is the irony of it) it is understood that prospecting of what was an O'Brien Sifton area resulted in uncovering a silver vein that will be a useful adjunct to the Miller Lake O'Brien. So that section still has its story uncompleted. Elsewhere, Mr. Sifton has not fared well in his mining ventures. He and his associates also were pioneers in the Columbia oil fields. They had the rail position, as it were, in the race, and Kelly was confident Columbia had oil fields of first magnitude. Lord Murray of Elibank, representing the Cowdray interests, was not as quick as Kelly of Canada; and yet Kelly could not convince his Canadian partners that he was right. Now-a-days the International Petroleum corporation and others think so well of Colombia that they hold millions of acres, part of which was within Canada's grasp.

W. P. Alderson Of Mexico And Alaska

Senor William P. Alderson hardly arrived from the Thompson-Doheny-Nayarit mining property in Mexico than he went off in light marching order to Alaska, where the same principals have a mining and milling situation that promises more than it has performed, although current returns are not despicable. Senor Alderson has unbounded faith in Mexico and its mining fields; only it is somewhat realistic to have twelve men killed by bandits on the trail a day ahead of him and his mule. He believes the Canadian North Country has advantages surpassing others, when necessary capital is employed on the break-away basis of all things being equal. Mexico is a Miner's Land of Plenty, according to the Senor originally from the "Soo", erstwhile of Porcupine and Sheep Creek, British Columbia—and yet the taxgatherer is somewhat too vigorous with both arms, and many producing companies are not so fortunate as his, in being so close to a railway and the seaboard. To have your clean up high-graded by bandits is not at all jocular. When Mexico is at normal, there will be more mines, and more money seeking Mexico. Meanwhile Senor Alderson thinks Northern Ontario, British Columbia and Alaska will hold the stage, unless Elbow Lake and environs proves up more to the satisfaction of the large companies represented there. The Thompson Doheny-Budd Alaskan holdings are apt to obtain greater prominence. With a milling grade of $10, the matter of quantity is being determined. Power facilities are a pre-requisite, however, and either the Government or mine owners will have to provide that in order to maintain year round operations. Smaller plants are using gasoline. Hauling coal long distances in that country is far from being economical. Messrs Thompson and Doheny have done privately what more of their kind might take for example.

Dome Operating Costs

Special circumstances made for higher operating costs at the Dome Mines in 1921. They amounted to $4.558 per ton milled, as against $1.529 in 1920, which left a per ton profit of $3.246. This, says Mr. DePencier, "is more than accounted for by the increased expenditure on development work, this expenditure being $1.123 as compared with $0.925. There is also an increase of 70,000 tons in the broken ore reserve, as against a reduction of 50,000 tons in 1920. Labor was plentiful but many materials are still high, largely owing, it is stated, to high freight rates.

Mr Thomas A Edison, who is a strong advocate of Government acceptance of Mr. Henry Ford's offer to development of the Government's nitrate and paper projects at Muscle Schools, Alabama, has been invited to appear before the Senate Agricultural Committee to present his views on the subject. In an informal interview Mr. Edison said he was keenly interested in developing a domestic source of potash capable of competing with the German product. He is experimenting with a large slate deposit in Tennessee said to have a high potash content.

News of Mining

Great Britain

Ireland's annual output of coal is roughly 90,000 tons or only 149 tons per annum for each underground worker. Ireland's imports are 4,500,000 tons. Peat produced totals annually 7,000,000 tons. Peat is by far the most commonly used domestic fuel, and practically all of it is hand-cut.

The Welsh coal market is showing a pronounced depression. The stimulus expected from the effect of the United States coal strike has not materialized.

Europe

Germany's coal output for 1921 totalled 145,610,000 tons and 123,011,000 tons of lignite, the former figure including production from the Ruhr Basin. Both figures are considerably larger than the returns for the year 1920.

From 233 lignite mines in Czecho-Slovakia, the output was 21,050,712 tons and from 372 bituminous workings the output was 11,648,000 tons for 1921. For each man employed in lignite mining the yearly output was 408 tons, the bituminous output, 153 tons. The production of steel amounted to 917,662 tons.

Experiments in the production of steel by the reducing action of aluminium and carbon are being carried on at Givet, France. The process is developed in three stages, reduction of iron, manganese and silicon from their oxides; reduction of the added alumina to aluminium carrying in solution ferro alloys; and oxidization of impurities at the high temperature induced by the alumino-thermic reactions. An important phase of the process is the utilization of impure ferruginous bauxite.

January output of crude oil from the Baku fields showed an improvement of 1.6 per cent over that of December, 1921. It amounted to 15,446,000 poods, a pood being 36 pounds. The February output was slightly less, 14,423,000 poods; and the March output, 16,500,00 poods.

A conference of 1,200 leading German industrialists in Hamburg lately was decidedly pessimistic in tone. It was generally agreed that the depreciation of the mark and the scarcity of raw materials were having a bad effect on German trade, and that the German worker might soon have to forego the luxury of the eight-hour day.

Imports of coal into Germany from Great Britain during the first four months of this year amounted to 1,330,000 tons. A report from Essen states that the increasing volume of these imports is causing uneasiness.

The export of iron and manganese ores from Russia to Germany is beginning to assume noticeable proportions.

It is said that the shipments of iron ore from the port of Luleaa in Sweden will this year total 1,500,000 tons, as against 200,000 tons for last year.

Australia

Drilling for oil has brought some little encouragement at Montajap, Victoria. Here drilling has progressed to a depth of 450 feet, and evidence of the existence of oil has been encountered. So far the evidence is qualitation rather than quantitative.

Various schemes of treatment are being considered for the treatment of the lignite of the Morwell beds, close to Melbourne. At present the much-used German system of briquetting is in favour; but it seems probable that a more modern system, such as low temperature carbonization, will be eventually adopted.

United States

The United States Geological Survey is encouraging "wildcatting" for potash in Texas. The Survey urges core-drilling so that records of the occurrence of potash may be kept. Already several companies have let drilling contracts.

During the week ended June 10th United States Mint purchased 1,955,000 ounces of silver. The total purchased under the Pittman Act amounted at that date to 114,178,756 ounces.

The Interstate Commerce Commission has ordered a ten per cent. reduction in freight rates on iron ore originating in Michigan, Minnesota and Wisconsin. The new order goes into effect on July 1st.

The mining industries supplied United States railways with about 588,000,000 tons of freight during 1921. This represents about six times the amount of agricultural freight moved, and about four times the freight contributed by manufactures. A closer classification of freight would give mining an even greater advantage.

South America

Output of coal in Chile, the chief South American producer, amounted to slightly over 1,000,000 tons during 1921.

An appropriation of about $14,000,000 has been made by the Government of Brazil to finance the first stage of a general plan for the electrification of the Brazil Central Railway.

A few weeks ago the first shipment of petroleum, since the war, was made from Buenos Aires to Germany. The shipment was 7,690 metric tons. During the month of April the Argentine production of petroleum was 32,000 metric tons.

Amongst other recommendations, the President of the Uruguayan Republic, in his message to Congress, suggested the nationalization of coal and petroleum resources.

NEW METAL BROKERAGE FIRM

The announcement was made last week, of the establishment of the business of Messrs. Honston and Dutton, Metal Brokers. The new firm are quartered in the Toronto Stock Exchange Building, 84 Bay Street, Toronto. The firm will deal chiefly in the more important metals of the non-ferrous group, including copper, silver-lead, zinc and tin ores, concentrates and reductions. Later on they will be dealing in the refined products of Canadian mines. The firm are hoping to establish strong connections with large and influential firms in Europe who are engaged in the international metal trade, and will undertake forward contracts with Canadian mines. The partners in the new firm are Mr. R. S. Honston of Toronto, and Mr. S. W. Dutton, who recently arrived in Toronto from Australasia.

The Transvaal gold output for May 1922 amounted to 629,786 fine ounces, as compared with 511,338 fine ounces for April 1922 and 687,776 fine ounces for May 1921.

Notes From Nova Scotia

The Meeting at Truro

A convention of the United Mine Workers was held last week in Truro to discuss the Scott Award, but to all appearances it seems to have attended to everything else, but the business for which it had been called. Evidently all that Mr. McLachlan (who seems to have dominated the meeting) wanted, was an opportunity to show his scorn and contempt of the findings of the Scott Board. He had boasted that he had succeeded in forcing the hands of the Government to appoint a second Board, but now that it was finished and had given out an adverse decision, he stated that "the U. M. W. were through with Boards, and that all future victories would be won in another way."

The whole tone of the convention was most disappointing to those who looked for better things. Arrogance of manner and impudent language marked its attitude towards a Government that had turned an attentive ear when the cry for a second Conciliation Board went up. There was neither common civility nor respect shown, much less gratitude in recognition of the fair and generous treatment of the Federal Government. There wasn't even an attempt made to disguise the feelings of men who, however much they may have been disappointed by the Award of the Board, were in duty bound to act as respectable citizens. A studied hostility was openly manifested to all Governments, all established authority, and indeed to everything except to Soviet Russia and communistic rule.

A Soviet Rule in Fancy

For the brief span of one week while the Convention was in session, J. B. McLachlan was a real "Lenine", living in imagination the revolutionary life of a Russian Bolshevist, and revelling in dreams of a "new heaven and a new earth" under the benign influence of the Third International of Russia. And at the end of that "perfect week" he had the supreme pleasure of knowing that he was the chosen delegate to represent the deluded and reactionary miners of Nova Scotia in a supposed labour convention to be held at Moscow. No other delegate would accept the doubtful honour, and one after another turned it down, when finally it was tendered to the man who heretofore had expressed a fond wish to shake hands with Lenine and Trotsky. But before he is sure of being on the way to Russia, McLachlan has an election to run, and "there's many a slip 'twixt the cup and the lip."

For some weeks the public press, when in lighter vein, laughed at the proposal of McLachlan to give Russia a loan of fifteen million dollars in wheat. But these have suddenly awakened to the fact that they have a real Red representative among them, who would, if he could, hand over the whole country, wheat fields and all, while performing his servile obeisance to Lenine.

Nor were the majority delegates who carried the Truro convention to communistic extremes, ignorant of what they were aiming at. Openly they fanned the Russian Reds and just as openly passed a resolution that we proclaim openly to all the world that we are out for the complete overthrow of the capitalist system and the capitalist State, peacefully if we may, forcibly if we must, and we call on all workers, soldiers and minor officers in Canada to join us in liberating labour."

A Warning from Moderate Leaders

And when their frenzied oratory was at its height, such moderates as President Baxter, and International Board Member Barrett warned the members of the folly of following false gods and attempting to introduce the principles of the One Big Union, and trying to link up an industrial with a political organization; then McLachlan stood up and stated that these men knew nothing whatever of the matters under discussion.

Who did know? certainly not McLachlan, for if he had kept in touch with Trade Unionism in Russia he would not soon have forgotten the impassioned appeals of the labour organizations of that ill-fated country to the Trade Union Federations of Britain and other European countries. What force stayed the trend of the great international organizations of Europe from joining up with Russian labour unions? Was it not the statements of fact that there was no longer any labour organizations in Russia, that all of these had been wiped out and their officers and members by the thousand had been done to death by the Red communists when they stood up for the principles that govern trade organizations? And was it not the revolting story of the cruel persecution, imprisonment and death of thousand of socialists who had spent many years toiling, as they thought, for the liberation of their country? Such was the fate meted out to sincere and honest Russian workmen of all classes by intolerant, cruel, ignorant and illiterate Communists "red in tooth and claw." The Russian labour organization, as such, was swept away and a Third International, which is nothing else than a political organization, took its place. With the members of this body, the miners of Nova Scotia have decided to affiliate!

Bolshevist Delegates, but Sound Population

But why juggle with words, when the very spirit of the majority of the Truro delegates breathes out defiance to all established authority, demands the overthrow of the present industrial system and goes about to accomplish it by the treacherous seduction of the army and other guardians of law? It was an open exhibition of the Bolshevist spirit, as we have been taught to know it by its fruits, which have brought death and destruction to hundreds of thousands of patriotic Russians, and is still yielding its toll of millions by the terrible results of chaotic conditions brought about by ignorant idealists.

Men who can gloat over such horrible conditions and glorify them as idealistic, are not good citizens, but are criminal in instinct and revolutionary in name. They are dangerous enemies of the state, only awaiting an opportunity to rend the nation to pieces and fill the country with strife and bloodshed. To pervert the miners of Nova Scotia and other workers from good citizenship, by sowing the seeds of sedition and class hatred, is the avowed purpose of McLachlan and his followers; and we can depend upon it, they will be "instant in season and out of it" in carrying on their vile mission. No other country would tolerate such an outburst of rank disloyalty, and no country, not even Canada, can permit such dissemination of poisonous sentiment without a pollution of the public mind and a loss of respect for constituted authority that will finally lead to the overthrow of its moral forces and to Anarchy within.

But after all, the miners of Nova Scotia do not comprise the great bulk of the population even if they were all Reds, as they are not, and it will not be an impossible task for the rest of the population to give this class to understand that British liberty and British law still

guard the homes of the peace-loving citizens of our Province and Country

A Red Resolution

By a large majority a motion was passed to accept no reduction of wages. What this means, when it is known that a reduction has been in force since last January, is evident only to the men who find consolation in passing such a resolution. Of course, it prevents the Scott award from going before the rank and file to be voted on. But all the work of the convention was highhanded and was not in keeping with the constitution of the Mine Workers' organization. All references by the extremists to the Scott board were insolent and insulting, to say the least. Chairman Scott had shown a great deal of sympathy with the miners, had gone out of his way to please them, and did almost everything he was asked to do by them; yet he is described in the following resolution—"like a vaudeville actor, he wasn't among us with his part in the show cut out for him. Among us he went through his little stunts, made his bow and, like a vaudeville actor, left us." "The Scott Act ought to be rejected now by this convention." Clause No. 3 demonstrates the lawless feeling of the meeting and clearly points out what would happen in Nova Scotia if the extremists among the miners had their way. "No. 3 clause—Over the heads of Governments, we appeal to all soldiers and minor law officers that they join with us in our attempt to secure for our class and their class, the working class of Canada, a living, and free access to all the means of this country." Half a million citizens are threatened by a number of thoughtless firebrands whose whole stock in-trade amounts to a few catch phrases, through which they seek to call the attention of the world to the work of a convention that has been more notorious for what is failed to do than for what it has done.

"Strikes as weapons are obsolete," said Secretary McLachlan and he darkly hinted they there were others more effective and destructive. If he meant striking on the job, he was never more out in his reckoning. He declares that he is without love for all paternal governments, but he is more indebted to the Ottawa government for saving his face than he would care to admit. Had Premier MacKenzie King, in the interests of the public, not thought it wise to appoint a second Board, or had he even delayed the granting of that Board for a few weeks longer, striking on the job would be just as obsolete in the McLachlan way of thinking as strikes now are.

I do not know whether Mr. D. H. MacDongall increased in stature when he read the statement of Secretary McLachlan "that if the U. M. W. came out in the open to fight, it would be defeated." But coming from such a source it was quite an admission, and was enough to give the average man a great conceit of himself. Of course, Mr. MacDougall is above the average man in many ways, especially in common sense, and I have no doubt there was little extra chest expansion when he read the statement. But a Highlander has the quality of waiting, and a time may come, if McLachlan persists, when patience may be set aside, and "on yonder brake beneath the cliff, another Red M—will lie both stark and stiff." Metaphorically, of course, but nevertheless true. The Vice-President has ere now brought more than one proud Chieftain to his knee. He knows the game and is a seasoned veteran, and when an opponent worthy of his steel closes with him in deadly strife, he may well "look to sun, moon and stars, as what he ne'er might see again."

Mooted Improvements in Steel Plant

Much is being written about improvement to the Sydney steel plant, and no doubt there is much to be done. A new blooming mill and fifteen new open-hearth furnaces are on the program. How soon work on these will begin is yet in the lap of the gods. The expenditure will be large, but it is understood that the saving per ton of steel will be such that on an annual output of one million tons per year the whole cost would not take many years to pay off. A number of the open hearth furnaces are ready to re-light, and gradually new departments are starting up, adding to the number of men employed.

Mr. Bischoff's Appointment

Mr. W. H. Bischoff is General Superintendent at the Sydney steel plant. He is well known to the men of the plant, and his is a most popular appointment. He is a big man with a smiling face, and has a kind word for all. When on his return he passed through the works, he had a real Highland welcome and was greeted on all sides by men of all departments. He had formerly served with the Company for over three years, and during that time he had made a host of friends.

BARIUM AND STRONTIUM IN CANADA

The Mines Branch, Department of Mines, Ottawa, has just published *Barium and Strontium in Canada,* by Hugh S. Spence, a volume of 100 pages with numerous diagrams and illustrations. Herein are described all the known occurrences in the Dominion of barite and celestite, the chief minerals containing barium and strontium. Appended are sections describing the uses of each of these minerals.

The market for barite is limited. It is used principally for the production of lithopone, which is a paint for inside use composed of 70 per cent. barium sulphate and 30 per cent. zinc sulphide. It is made by reducing the ground barite (barium sulphate) to the sulphide by roasting with coal, and adding to it, hot, a solution of zinc sulphate. The resulting chemical reaction produces zinc sulphide and barium sulphate, as noted above. It is much cheaper than pigments made from lead or zinc. A long series of chemical reagents containing barium is also made from barite.

The principal deposits of barite of commercial importance are at Lake Ainslie, Cape Breton, Nova Scotia, and near Tionaga, Night Hawk River, Fort Matachewan, Mistinikon Lake, and near the Elk Lake, Gowganda road, all in Northern Ontario. The latter three, though good veins, 6 to 10 feet in width, are remote from railroad transportation. The Lake Ainslie deposits have accounted for the bulk of Canada's production to date.

The market for strontium minerals is extremely limited. It provides the "red fire" for signal flares, and is also used in one of the processes of refining beet sugar, for which latter barium compounds are likewise used. Celestite is the principal strontium mineral in Canada. There are several occurrences of possible economic importance, all in Ontario, principal among them that near Calabogie, in Renfrew County, where a small grinding mill has been erected.

Gold continues to be the principal export of the South African Union. Out of a total export of merchandise last year amounting to £62,265,363, the gold export was responsible for £34,453,586, or 55 per cent of the whole.

For the first time in several years India has been recently an importer of coal. This abnormal situation was occasioned by the serious coal strikes and railroad strikes in the country. Recently several hundred thousand tons of coal per month have been imported, chiefly from the United Kingdom, but also from Natal and Australia.

British Columbia Letter

Crow's Nest Pass Coal Company's Year

The annual report of the Crow's Nest Pass Coal Company for the year ended December 31, 1921, was presented at the annual general meeting of the shareholders, held here on June 9. The financial statement shows that the net profits from all sources amounted to $341,938.98. Four quarterly dividends of one and a half per cent. each, making six per cent. for the year, were disbursed, the total amount distributed among the shareholders being $372,690. The sum of $93,725.51 was carried forward to 1922. The two subsidiary companies, the Crow's Nest Pass Electric Light and Power Company and the Morrisey, Fernie and Michel Railway Company, showed operating profits for the year amounting to $5,008.75 and $18,245.07 respectively. Capital expenditures during the year amounted to $105,418.68, on behalf of the coal company, and $3,582.16 for extensions and equipment for the light and power company.

During the year the company mined 774,847 tons of coal and made 66,569 tons of coke; this compares with 779,942 tons of coal and 75,928 tons of coke produced in 1920. The decrease is attributed to the general depression in trade.

The following officers were elected for the ensuing year: W. R. Wilson, Fernie, president and managing director; H. B. McGivern, Montreal, first vice-president; W. H. Robinson, Granby, Que., second vice president; A. Klauer, Fernie, treasurer; and J. H. Irvine, secretary. The directors appointed were: E. P. Earle, New York; G. W. Howland, Toronto; J. F. Edgar, Toronto; A. H. MacNeill, K.C., Vancouver; J. T. Maher, St. Paul; and L. G. Gilman, Toronto.

Fluorspar in Boundary District

Work has been resumed at the Rock Candy mine and mill at Lynch Creek. In 1920 more than 7,500 tons of fluorspar concentrate was shipped from this mine, but it was closed down early in 1921, on account of the general dullness of the fluorspar market. Most of the output in the past has gone to steel works in the State of Indiana, and it is understood that the Consolidated company has negotiated a contract that will keep the mine working at capacity for the next twelve months. Between 60 and 70 men are employed in the mine and about 20 in the mill.

Barbara Mine, near Greenwood, Unwatered

Local citizens have shown a good deal of public spirit by contributing work and funds for the pumping out of the old Barbara mine, in order that it might be examined by engineers whose principals are prepared to develop the property if the report of the engineers is satisfactory. The Helen mine is now being unwatered by a similar arrangement.

Boring for Oil

Duluth and Minneapolis capitalists have formed a syndicate for the purpose of exploring for oil over a considerable area of the upper Peace River. A considerable amount of machinery has been forwarded to the property, and it is expected that seven bore holes will be sunk during the present summer. J. A. Merrill, of Superior, has located the positions for the boring operations.

Cork-Province Mine, Kootenay, now Working

Work has been resumed at the Cork Province mine under the supervision of W. Yolen Wilbur, who at one time was mine superintendent for the Granby company. The 45 foot winze on the largest, or the east, ore body is to be sunk to the 100-foot level and a drift will be driven back to the main three compartment shaft, which it is proposed to sink at the same time. A hydro electric plant will be installed during the present summer at Kaslo Creek, to replace the present water power plant, and it is expected that the mill will be put into operation some time in August. The Cork Province ore contains a considerable amount of zinc, which in the past has gone to the tailing dumps, and it is estimated that somewhere in the neighborhood of 10,000 tons of zinc concentrate has been lost during past operations. This in the future will be saved, and, under the Trail zinc schedule is expected to net the company about $15 per ton. It is expected that in future the mill will yield about 13 tons of zinc concentrate and 10 tons of lead concentrate daily.

Silversmith Progressing

John B. White passed through here recently on his way to Spokane, after making an examination of the Silversmith mine. Mr. White, who is president of the Silversmith company, spoke enthusiastically of the splendid way in which the mine is developing. New ore bunkers and a filtration plant are being added to the mill, and its capacity, which is 125 tons of ore daily, will be brought up to about 150 tons.

Activities round Nelson

Mining conditions throughout this district are improving rapidly, and it is anticipated that after the convention, which takes place during the first week of July, a good deal more money will be invested in the mines surrounding Nelson, a number of people having expressed their intention of attending the convention with that end in view. Work has been resumed at the Surprise mine at Sandon. H. H. Dimock and partners have taken a bond and lease on the Molly Hughes; and the Nugget, Queen and Emerald companies all have increased their working forces.

Thomas McAllister, pioneer mining man of the Cariboo and Kootenay districts, died at his home at Milner, on June 10, aged 72.

More Ore at Rossland

The continuity of the bonanza ore shoot at the I. X. L. mine has been established, and it is expected that another car of ore will be shipped shortly to the Bunker Hill and Sullivan smelter. Mrs. A. J. McKinnon has started a small force of men in the Golden Dip mine, which adjoins the I. X. L. and already some promising gold ore has been found.

Portland Canal District

S. G. Benson has uncovered a two foot vein on the Lucky Boy claim, and has traced it for 250 feet on the surface. An average of samples taken from different parts of the vein is said to have given an assay of $126 per ton in lead and silver. The claim is situated within a mile of the Salmon River wagon road and within 100 years of the new government trail up Eight Creek, so there will be no difficulty about the shipment of ore should the prospect be converted into a mine.

J. J. Coughlan, president of the Silverado Mining Company, arrived from Vancouver recently to make a general survey of the conditions at the property.

Harry Howson has arrived, and will take charge of the exploration work at the Big Missouri mine for A. B. Fraser and associates, who recently took an option on the property.

Grant Mahood has returned from a trip South, where

he succeeded in floating the American Mining and Milling Company, Limited, with an authorized capital of $1,500,000, for the purpose of developing mines in this district. Operations will be started on the Betty mine, which is situated about seven miles north of the Premier, and it is said that $100,000 is available for exploration and development on the property. Some promising ore has been exposed on the surface, and an attempt will be made to develop this at depth. The company is composed of substantial business and professional men, most of whom reside in the city of Vancouver.

O. B. Bush, who has been associated with Grant Mahood in a number of mining ventures in this district, and who recently sold his interest in the B. C. Silver Mines, Limited, has formed a company to bore for oil at Huntington Beach, California. Apparently Mr. Bush has tired of the long winters and short summers of this district.

Nichol Thompson, well-known mining man of Vancouver, is in the district at the time of writing, looking over the many claims in which he and his associates are interested.

J. A. Bancroft, assistant manager for the Granby Consolidated, is looking over a number of properties for his company. Mr. Bancroft always is a popular examiner, as even when he turns a property down, often he will make suggestions as to its future development, and, if the work is carried out, it is possible that a second examination will be made.

Ore Receipts at Trail

Ore receipts at the smelter for the first week in June totalled 7,997 tons, of which 7,288 tons came from the Consolidated company's mines, practically all from the Sullivan. The other shippers were: Black Rock, Northport, 39 tons; Ottawa, Slocan City, 11 tons; Guelph, Republic, 155 tons; Rosebery Surprise, Rosebery, 61 tons; Silversmith, Sandon, 273 tons; and Surprise, Republic, 164 tons.

Dolly Varden Impasse

Mr. Debrisay, acting for George Wingfield, of Reno, Nevada, has obtained an order *nisi* from Justice Morrison for foreclosure of the Dolly Varden and Wolf mines and the Dolly Varden-Alice Arm railway and rolling stock, covered by a mortgage given to the old Dolly Varden Mines, Ltd., in 1919. The original amount of the mortgage was $150,000, but accrued interest has swelled it to $200,000. Though papers were served on the Taylor Engineering Company, Taylor Mining Company, C. M. Rolston, trustee for the bond holders, H. C. Chiene, trustee for the creditors, and Dolly Varden Mines, Ltd., no defence was entered. It is rumored that a private agreement has been reached between Mr. Wingfield and the Taylor Mining Company, whereby the latter may redeem the property within a given time by entering into certain financial conditions, but no confirmation of the rumor can be obtained. The order given by Justice Morrison calls for an accounting, and will have to be spoken to again before it becomes absolute.

New Coal Bunkers for Vancouver

New docks and coal bunkers are being erected on Vancouver harbour near the terminal of the Canadian National railway by Misak Aivazoff, for the storing and handling of Vancouver Island coal. It is stated that the whole construction will cost in the vicinity of $50,000.

To Drill for Coal in the Omineca

The Robinson Co., of Vancouver, has been awarded the contract for diamond drill work on the defunct National Finance Corporation's claims, in the Copper River district, Omineca mining division. The contract was given by the Yorkshire Trust Company, liquidators of the Finance corporation. Five seams of semi-anthracite coal have been developed near the surface, and the drilling is being undertaken with a view to attempting to prove the continuity of the seams. If successful it will demonstrate the existence of several million tons of coal. The coal property is said to be the largest single asset of the defunct company.

Canada Carbide Branch in B. C.

Among the new companies recently gazetted are the Okanagan Coal Oil and Gas Company, Limited, with a capitalization of one million dollars and headquarters at Vernon, B. C., and the Canada Carbide Company, Limited, with a capital of two million dollars and provincial office in Vancouver. The latter is a Quebec concern, that has sought and obtained extra-provincial rights in this province.

CORRESPONDENCE

MR. DENIS UPHOLDS OLD ADMINISTRATION

To the Editor,
Canadian Mining Journal.

Sir,

I have read, with mixed feelings, your editorial entitled "Aiding Prospectors in Quebec," which appeared in the "Canadian Mining Journal" of June 23rd.

I agree with the remarks that the Quebec Mining Laws, previous to 1909 were awkward and faulty, and the changes introduced in 1909, practically adopting the main principles of the Ontario Law, was a tremendous step forward. I can speak of this impartially, as I had nothing to do with the change. When I came to Quebec, in 1910, the new regulations were in force. However, I strongly and emphatically dissent from the comments regarding "the key to the backdoor of the recording office," and that "Northern Quebec was a preserve closed to all prospectors except those with influence at Quebec city", as well as "the mining law was faulty and its administration was worse." These are rash statements, probably based on the criticisms of a disgruntled prospector, which are out of place in the editorial page of a publication of the standing of the "Canadian Mining Journal", for I am convinced that they have no foundation. Our predecessors in office, technical, executive, recording and others, had quite enough of a handicap with the old mining law regulations without imputing to them such vile motives as your editorial implies. I have been twelve years in office here, and I have failed to observe, from the records or otherwise, the slightest dishonest irregularity which might have taken place before I came, and in saying this I am not at all actuated by the sentiment that "de mortuis nil nisi bonum," but merely by justice and fair play.

Yours, etc.,

THEO. C. DENIS.

Bureau of Mines, Quebec.
June 27th, 1922.

That the very same asphalt used by Christopher Columbus on his third voyage to America to caulk his ships, should be one of the chief sources of material for the manufacture of acid-proof floors for chemical plants and laboratories, will be demonstrated at the Eighth National Exposition of Chemical Industries which will be held in the Grand Central Palace, New York, during the week of September 11th-16th by the Barber Asphalt Company of Philadelphia. The romance of the Island of Trinidad with its famous asphalt lake, which has furnished more paving material for streets of the world's cities than any other source, and the numerous applications of this material and its derivatives in the chemical industry, will be shown at the Exposition this year.

Northern Ontario Letter

Hollinger Record

The dividend of 1 p.c. on shares in the Hollinger Consolidated Gold Mines, payable July 15th, to stockholders of record June 30th, will call for the distribution of $253,692.30, and makes a total of $1,775,846.10 so far this year.

Production and dividends from the property since the beginning in 1911 follow:—

Year	Production	Dividends
1911	$ 46,082.52	$ ———
1912	933,682.00	270,000
1913	2,488,022.58	1,170,000
1914	2,719,354.47	1,170,000
1915	4,205,901.69	1,720,000
1916	5,073,401.05	3,126,000
1917	4,261,938.72	738,000
1918	5,752,370.87	1,230,000
1919	7,063,099.21	1,722,000
1920	7,162,611.13	2,214,000
1921	10,314,515.31	3,198,000
*1922 (est. 1st half)	6,000,000.00	1,775,846
Totals	$56,020,979.55	$18,333,846

* Includes dividend payable July 15th.

The ore reserves on the Hollinger were estimated to contain upwards of $40,000,000 at the beginning of the current year. Since that time, a large amount of development work has been done, and, in addition, the company has purchased the adjoining 160 acres known as the Schumacher Gold Mines. There are also reports that property to the south of the Schumacher, owned by the Mining and Finance company, may be taken over by the Hollinger. This all indicates a broadened area within which to still further increase the ore reserves.

In addition to having paid $18,333,846 in dividends, the company has a surplus of approximately $5,000,000, as well as owning a plant valued at about $5,000,000.

Discovery Reported in Ossian Township

A discovery of gold has been made on mining claims located in the township of Ossian, lying to the north-east of Larder Lake, and about twenty five miles east by a little north from the producing section of the Kirkland Lake district.

No details of the find are reported, with the exception that the gold occurs in a wide body, and is a very encouraging occurrence as shown by average assays.

A feature of the discovery is that it lies directly in line with the strike of the Kirkland Lake series of rock formation and is probably a direct result of prospectors going out in search of ore deposits in this easterly continuation of the belt.

The township of Ossian is adjacent to the inter-provincial boundary of Ontario and Quebec. It is interesting to note that it is to this part of the province of Quebec that the Geological Survey, Ottawa, is directing special attention this year.

Hoist for Deep Levels at Teck Hughes

The installation of a 100 ft. hoist, electrically driven, has been completed at the 500 ft. level of the Teck-Hughes mine. This machine will enable the company to operate to a depth of 1,500 feet.

The significance of the installation of this big machine is that from this date forward the plan is to draw ore from the 605 and 730 ft. levels. As is generally known, the Teck-Hughes has not been able to draw ore from these two levels pending the installation of this big hoist, so that production since early in the current year has been from ore taken from or above 500 feet deep.

Since November last, some exceptionally rich ore has been developed at the lower levels of the Teck Hughes and the production figures in December and January showed the ore averaging around $20 per ton, or approximately double the normal average. Recent development work has proved the existence of rich ore in important quantities at these lower levels, so that drawing ore from these points will signalize a big increase in production.

Instead of treating 160 tons daily as has been the recent rate, and producing around $10 a ton, or $1,500 or $1,600 daily, it will be reasonable to look for a production of about $2,500 daily, beginning July, this coming from about 140 tons of ore yielding about $18 per ton. Indeed, the indications appear to be that the Teck-Hughes will run the Wright-Hargreaves a close race for first place in point of current production in the Kirkland Lake district.

McIntyre Results for Fiscal Year

The McIntyre Porcupine closed its fiscal year on June 30th, and will show an income of about $1,900,000. This achievement compares favorably with the preceding year, when $1,904,326 was produced.

Due to carrying on a large amount of development work, the average recovery per ton has been lower during the last half of the fiscal year than the average grade of the ore in reserve. For instance, during the third quarter of the fiscal year the mill handled an average of approximately 536 tons of ore daily or a total of 48,255 tons for the three months. This resulted in a production of $450,835, or an average of about $9.31 a ton. This compares with an average of $11.08 a ton during the fiscal year ended June 30th, 1921 and $9.58 a ton since the beginning in 1912.

Up to the end of the company's fiscal year ending June 30th, 1921, the mine had produced $11,035,561 so that (taking the indicated output of $1,900,000 for the fiscal year just ending, the total production of the McIntyre Porcupine has now reached $12,935,561.

It is too early to announce the amount of operating profit, but the indications appear to be that it will compare favorably with the preceding fiscal year, when $815,562.53 was shown.

During the period just closed the McIntyre disbursed three dividends, each being 5 p.c., making a total of $516,012.15, thereby indicating that a substantial amount was carried to surplus.

Factors of outstanding importance in connection with the new fiscal year which begins July 1st are that the McIntyre has been opened up to the great depth of 1,875 feet and that in addition to proving the downward continuation of big orebodies it has been found that one important orebody which had been expected to pass off onto the adjoining Acme property of the Hollinger has taken a turn and remained on the west claim of the McIntyre. Another important factor is that the fifty per cent. increase in milling capacity is just going into operation and the new fiscal year offers promise of far eclipsing all previous records by passing close to $3,000,000.

The Lake Shore during May

During the month of May, according to the regular monthly statement just issued by R. C. Coffey, manager, the Lake Shore mine produced $40,834.20. The mill ran 93.14 p.c. of the possible running time and handled an average of 71 tons of ore daily, this being the highest tonnage record so far in the company's history. A total of 2,212 tons were treated, the average yield being $18.46 a ton, about 25 p.c. lower than the average value heretofore. Even this temporarily reduced average leaves the Lake Shore in the position of having treated higher grade ore than any gold mine in Ontario during the month of May.

Mr. Harry Oakes, President of the Lake Shore mining company, has re-affirmed his original intention of using his present small mill until his mine shall have showed up a greater tonnage of ore in reserve.

The stock of the company was originally sold at an average of about 30 cents a share, and the regular dividends of 2 p.c. quarterly now announced, amount to over 25 p.c. annually on the original investment. As regards the clamor of more recent purchasers of the shares for a higher dividend return, that is a matter which has probably caused Mr. Oakes no particular concern. The president of the Lake Shore has shown himself to be exceedingly capable.

The work of enlarging the main shaft will proceed at once with a view to developing the downward continuation of the orebodies at a depth of 800 feet.

A dividend of 2 p.c. will be paid Aug. 15th to shareholders of record Aug. 1st.

Clifton Porcupine Development Work

Equipment for the milling plant on the Clifton-Porcupine is on the way to the property. Foundations are being placed, and the present plans are to have the plant in operation within the next ninety days.

Surface exploration is being carried on and has resulted in opening up a vein system from which high assays have been taken. Arrangements are being made to resume underground work within the next few weeks, and part of the program will be to cross-cut from No. 3 shaft to the new vein system.

It has been announced that the greater part of the 170,000 shares allotted for financing construction work have been sold at 30 cents per share, without any commission being charged. The directors of the company have shown their faith in the undertaking by personally paying for the cost of selling these shares.

Harvey-Kirkland — a New Prospect

The Harvey-Kirkland is the name of a new company which is developing mining claims in the Kirkland Lake district. The group consists of four claims lying south of Gull Lake and East of the Montreal-Ontario property. These were formerly known as the Harvey and the Simpson claims and are regarded as promising.

The Harvey-Kirkland is capitalized at $5,000,000, made up of 5,000,000 shares of the par value of $1 each. The vendors were paid 1,000,000 shares for the properties and for the money spent previously the purpose of raising money for preliminary development, and this work is now well under way. At the time of writing, the treasury contains 3,000,000 shares, besides close to $50,000 in cash. A force of men is now engaged in doing surface exploratin as well as erecting another camp for the accommodation of a larger crew.

Crown Reserve on Gillies Limit

The Crown Reserve Mining Company is carrying on some surface work on claims in the Gillies Limit section of Cobalt. Some very strong veins have been found in Keewatin formation. There are no silver values of importance at outcrop, but the Crown Reserve is considering the question of diamond drilling for the purpose of determining the thickness of the Keewatin over the underlying diabase, with a view to exploring the veins underground at a point close to the Keewatin-diabase contact.

Canada's Mineral Production

Canada's production of gold up to the middle of 1922 has reached a grand total of approximately $488,617,107. The silver output of the Dominion up to this date amounts to $265,292,685, while the value of the copper produced up to the present time has reached approximately $270,529,237. The output of nickel amnnt to $173,173,403, while $54,000,000 in lead and $20,000,000 in zinc has been produced.

The aggregate value of these metals has reached $1,271,912,432. Not only this, but the physical aspects of the mines, with the exception of silver, hold out promise of new high records being established in the future.

For a new country to have produced over a billion and a quarter from the development of only the southern fringe of its mineral-bearing area is an achievement toward which captains of finance and industry are being attracted in great numbers. The indications are that an unprecedented wave of interest and development is at hand for this country.

Thousands of men are gaining their livelihood from work at the mines, tens of thousands of people are enjoying prosperity in the mining communities, while the savings of scores of thousands of men and women are bringing a high rate of return from investment in legitimate mining stocks.

Prospect at Wig-Wam Lake

Encouragement is being met with in the surface exploration work on the Wig-Wam property at Wig-Wam Lake in the Gowganda district. This property was formerly known as the Sanderson and attracted attention last year trough the discovery of a rich vein. It is stated that one vein is from two to three inches in width and carries high-grade ore in places. Another vein is from one to two inches in width and carries encouraging mineralization. Altogether, a large number of veins are in evidence.

During the past week the O'Brien mine shipped a car containing approximately 64,000 pounds of ore. This was the only ore shipment going over the T. & N. O. Railway during the week from Cobalt.

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EDITORIAL

CONFERENCE ON IRON ORE

The conference on iron ore called by the Honourable Harry Mills, Minister of Mines, in Toronto on July 5th, promises to mark an epoch in Ontario's, and Canada's, iron ore problem. Ever since Mr. Mills assumed his ministerial duties, he has evinced a special interest in this, the most serious single problem that confronts his department, as well as one of the most serious commercial problems that faces Canada. There is no need of repeating here the data that demonstrate the vast annual loss in the nation's revenue due to our present non production of iron ore; but we wish to draw attention again to the fact that the problem that Mr. Mills is now facing squarely is one worthy of the best attention he can give it, and likewise that he will need, to attain its solution, the energetic assistance of some of the best brains in our country.

That Mr. Mills is fully cognisant of the fact that voluntary effort alone will never solve the problem, is demonstrated by his having at once acceded to and seconded the request of the conference that complete data, and well considered recommendations therefrom, be gathered by a small commission of experts, the ablest that can be found, under a retainer from the Provincial government. Many have been the conferences on the question of Ontario's iron ore; but the resolutions adopted have in the main been empty verbiage, due to a lack of that concentrated and continuous human effort which alone is competent to solve the problem, and which is ordinarily not available unless it is adequately paid for.

For the first time (so far as we can learn) a prominent blast furnace manager is numbered among the practical optimists who for years have believed that the iron ore to be had in Ontario can be economically used. It is mainly due to this accession to the ranks of the believers that the conference was able to present a united front in recommending that the provincial government appropriate public funds to investigate the problem. Mr. J. D. Jones, manager of the Algoma Steel Corporation, is not only a technologist of outstanding ability, but also a hard headed business man. When, with his knowledge of the practical difficulties, he is willing to put himself publicly on record as in favour of an attempt to produce beneficiated ores in large quantity in Ontario, furnace managers with less practical knowledge and lacking his courageous pre-vision may well re-examine the situation.

This conference has been a demonstration of what can be accomplished when a keen mentality is applied with singleness of purpose to the solution of a public problem. When Mr. Mills called this conference together he must have had some misgivings lest the divergent, and possibly the selfish, interests of those present would obscure the vision of what is their common aim. Personal and sectional interests were, of course, discussed and at times threatened to monopolize the attention of the meeting. But judicial statements by several of the members were so impressive and were such outstanding features that the Minister was able, without undue effort, to direct attention to the main issues.

Mr. Mills has put his hand to the plow, and he is making a straight furrow. He is not a man whose attention will be easily diverted from his purpose. He has sought and obtained a popular mandate, voiced by the most competent leaders he could find. We hope and believe that he will have, from now on, the united and continuous support of those interested in Ontario's iron ore problem, and we are confident that this united effort will end in success.

LOW TEMPERATURE CARBONIZATION

The phrase "fuel economy" connotes to most of us practice in the ultra modern steam power plant. Since we were old enough to read we have been told that steam raising was a wasteful operation, but we were not impressed. We have remained, in effect, unimpressed.

We are quite as reconciled to wasting 50 per cent. or 80 per cent. of the utilizable energy in coal as were our fathers.

Nowhere in the civilized world is the problem of fuel supply more pressing than it is in Canada. It is well within the range of probabilities that a fuel famine will be the result, possibly the only result, of the present coal miners' strike in the United States. Being habituated to playing the part of the foolish virgin, Canada will once more find the lamp untrimmed and unfilled.

The present outlook is serious enough to all concerned, but what of the future?

Unlike Canada, Great Britain produces coal in large excess of her domestic requirements. Yet throughout the tight little island, engineers and chemists are devoting themselves to the thorough investigation of processes intended to supersede the inexcusably wasteful use of raw coal. In other words, Great Britain, although possessing more coal than she needs, is fully resolved to curb waste, and to insure her future independence as regards both solid and liquid fuels. And the Government of Great Britain is solidly behind the movement.

Present developments in the right use of coal centre round what is known as "low temperature carzonization," the practical antithesis of coke-oven and gas-retort practice. The burning of raw coal has been characterized by an English writer as a "barbarous, unscientific and uneconomical proceeding". It has been pointed out by competent authorities that the introduction of low temperature carbonization, whereby a smokeless coke is produced, and gasoline fuel oils, lubricating oils, ammonia, etc., recovered, will make Great Britain self-supporting in respect of all these products. That is, Great Britain, where about 149,500,000 tons of raw coal are now burned annually, would, by the general use of low temperature carbonization, save 75,000,000 tons of coal each year, produce about 500,000,000 gallons of motor spirit (the annual consumption is 200,000,000 gallons), create a large source of fuel oil, make all the nitrogenous fertilizers required, and incidentally, remove once and for all time the smoke nuisance.

This is the end to which hundreds of Great Britain's ablest chemical engineers are bending their energies. Their efforts have already been crowned with a measure of success. As it took one hundred years to bring the coke-oven and the gas-retort to their present state of efficiency, it is not to be expected that the new process, or processes, will be perfected without long trial and retrial. But we are inclined to agree with the engineer who expressed his conviction that the solution of the problems of this process is the most important event in the industrial world since the invention of the steam engine.

We hope that those who scoff at the work of the Canadian Research Council in this direction will at least be moved to inform themselves on a question that more widely and immediately affects our industrial future then even the development of hydroo-electric power or the utilization of our peat deposits. But in truth all three are sufficiently vital.

"THE BROKEN YEAR"

On several occasions we have quoted the utternances of Dr. George Otis Smith, Director of the United States Geological Survey. The combination of strong commonsense, clean-cut statement, and happy illustration, that marks his published comments on current affairs is as effective as it is unusual.

In a speech delivered recently before the National Conference of Social Work, Dr. Smith reviewed the coal mining situation in the United States, very crisply indicated the malady that afflicts it, and prescribed the treatment required. He spoke as a citizen rather than as the Director of the Geological Survey, but as a citizen whose special knowledge, soundly based, is at the service of the public.

Dr. Smith insists that before lasting industrial peace can be established, certain fundamental problems must be solved. These can never in this world be solved by strikes or by shut-outs, or by victory won by either employers or strikers. For the present impossible conditions, both labour and capital are to blame. "Too long" says Dr. Smith, in the exordium of his address, "have "the mine owners treated the coal business as private "privilege, and too long have the labour leaders, with "no less monopolistic attitude, obstructed every move "for underground efficiency and economy... Cheaper "coal and larger earnings will come when engineering "is emphasized more and bargaining less."

Only from the most distorted point of view can the operators be held blameless for the present *impasse*. But no unprejudiced observer would or could believe that the employers' culpability, in this instance, is at all equal to that of the labour leaders. Yet however the blame may be distributed, the effect is the same. The consumer pays the shot, a disastrously cumulative shot.

To quote Dr. Smith again: "A representative oper- "ator admits that one-third of the operating mines rep- "resent a burden on the industry, and he suggests their "elimination through bankruptcy... The United Mine "Workers' Journal admits that 150,000 miners...should "be eliminated, and he suggests that they leave the "mine for the farm."

From the fact that the average number of days that the coal miner works in the year is only 215 for the whole country, and that this average falls locally to as low as 192 days, more light is thrown on the wage rate difficulty. More continuous employment is possible only with the reduction of the number of workers and also with the reduction of wage rates. But both of these steps imply at once much larger annual earnings. The man who is employed 300 days of the year at $5 or $6 per day is in much better ease than he who works through the "broken year" at $10 per day. "It may well be questioned" says Dr. Smith "whether the pro- "ducer should be paid a wage out of all proportion "with the wage of the consumer." To clinch the point a very cogent question is asked: "Can a $5 a day work- "man afford to buy coal mined by a $10 a day mine worker?"

Coal miners' strikes have become more than a public nuisance, they are a gravely sinister menace. The savage spirit of the strike demands the spilling of blood upon its altars. The self-seeking demagogue finds it

easy to achieve popularity and leadership by inflaming the passions of the mob. The employer stands aloof. The consumer writhes at the approach of the winter of his discontent.

The lesson, and the consumer has been long learning it, is plain enough. In Dr. Smith's well-chosen words, "In bringing about the adoption of more business-like "practices in the coal business, public opinion must be "the force that refuses capital to open or operate un-"needed mines, that refuses to pay wages or profits "figured on an expectation of one-third idleness and "two-thirds work, that encourages off-season purchase "and storage of coal by consumers—and above all we "need an enlightened public opinion that puts a ban "alike upon the selfish disregard of the interests of the "producer of coal by the purchaser, and of the interests "of the consumer by both the mine operator and the "mine worker."

The ties of common interest that bind the miner, the operator, and the consumer have never been even tacitly recognized in strike settlements or in the regulation of current business. Implementing such a recognition would mean *Dividends to the employer, steady work and greater earnings to the miner, and coal at half current prices to the consumer.*

The broken year must be mended.

TRAINED PROSPECTORS

A tiny news item, tucked away in a corner of a newspaper from the prairies, has caught our attention. It is to the effect that a short course for prospectors and others interested in mining has been instituted at the University of Manitoba. This is welcome news, as it indicates that the postage-stamp portion of Manitoba, which of course controls the policies of the whole province, has awakened to the need of educating the men upon whom the development of its vast hinterland will depend.

We are, after all, far from consistent throughout our educational systems. Quite apart from the quality of what is imparted in our schools and colleges, we are very unequal in our distribution of the public benefit. One of the most obvious discrepancies, just at present, is the meagre provision made for the training of the pioneers of the mineral industry.

Of course, it is only within comparatively recent years that the training of engineers to operate mines was undertaken seriously in Canada. The fact that within a generation the direction of mining operations has fallen almost exclusively into the hands of technically trained engineers is a demonstration of what can be accomplished by means of sound education. It is true that there is still a residuum, as there always will be, of self-trained men in the profession, but these men have attained to their positions of responsibility on account of special abilities, which counterbalance the aid their confrères have had from a formal education.

It is still customary to think of the prospector as a peculiar fellow with a strange calling, and we hear from all quarters that the prospector is a type that is dying out. Some take this as an indication that prospecting is on the wane, and that our mineral industry will suffer correspondingly. Few realize the true facts.

There is at present taking place among prospectors a metamorphosis similar to that which has transformed the mining profession during the last twenty-five years. The old type of prospector is fast disappearing; but a new type is taking his place. The prospector of today grasps at every possible means of bringing to his aid the resources of modern science. He is by no means fully informed; but he knows it, and is anxious to learn. The success of the prospectors' classes conducted throughout British Columbia and Ontario during the past winter are sufficient to demonstrate a hunger for information that speaks well for the digestive capacity of the prospector's mentality.

It is more than likely that the prospector of tomorrow will be as is the mining engineer of today. It may be that education within college walls will not prove the best means for educating him, though it has demonstrated its worth, contrary to the expectation of many, in the case of the engineer. It may be that the qualities of initiative and perspicacity, which are absolutely essential to a prospector, would be unduly stunted by a formal education—a charge sometimes laid against our engineering colleges.

Whatever may be the means by which the fruit and of science will be made available to the prospector, it is certain that eventually he will have it. It is incumbent upon those who are guiding the destinies of our mining industries to face this problem squarely, and then the solution will be found surprisingly close at hand.

HERE!

An over-capitalized non-producing mining company is threatened with trouble from its long-suffering shareholders. One of the insiders is supposed to give utterance to the following:

We've got to make our killing first;
And then, if there should hap the worst
Just watch our President! My eye
Just watch how he can make it right!
He'll name the expert to be counted
And blame on them what has occurred
He'll vow that he was quite outwitted
By what his engineers had said
He knows he never had a note
But spilling beans is not his line
I guess that we can trust him now
To navigate us through the row.

So when the talk and fuss blow over,
The bunch of us will be in clover.

XNON

Official Conference on Ontario Iron Ore

MEETING OF REPRESENTATIVE INTERESTS IN TORONTO ON JULY 5th.

When Ontario's present iron and steel industry was founded twenty five years ago, it was expected, and in fact assumed, that her iron ranges, known even then to be very large in extent, would furnish in abundance the low-grade ore for which the blast furnaces were built. The discovery of the famous Helen iron mine seemed to confirm this opinion. Prospectors swarmed over the iron ranges, scores of miles of them were taken up, and a good deal of capital was expended in acquiring property and in exploration. The main practical result was to prove the Helen mine likely to be unique, so far as exploration went. Another result was the disclosure of very large deposits of low-grade iron ore, the ore upon which our interest at present mainly hinges. So we have at present plenty of blast furnaces and steel mills in Ontario, but no available ore, with the result that many attempts have been made to solve the problem of providing our own ore for our own furnaces. The problem is still unsolved.

With a view to securing the co-operation and advice of those interested in Ontario's iron ore problem, the Hon. Harry Mills, Minister of Mines for Ontario, held a conference in Toronto on July 5th, to which he invited representatives of the various interests concerned. Between thirty and forty owners of iron ore deposits, blast-furnace operators, metallurgists, geologists, and representatives of the transportation companies assembled to aid Mr. Mills in discussing ways and means of attacking the problem anew.

Agenda

To regulate the discussion and to give it a proper setting, a programme was arranged, and authorities on each subject were asked to prepare a presentation of that phase. The following are the agenda:—

(1) The extent of the iron ore deposits of Ontario. Are they sufficient to sustain a native blast furnace industry of importance?

(2) The kind and quality of the deposits:
- (a) The iron ores of Eastern Ontario.
- (b) Deposits of banded magnetic, or mixed magnetite and hematite.
- (c) Siliceous hematite.
- (d) Siderites.
- (e) Bog iron ores.

(3) (a) The applicability of magnetic concentration methods for low grade magnetites, and subsequent briquetting or nodulising.
- (b) Processes for increasing the metallic content of siliceous hematites.
- (c) The reduction and nodulising of siderites.

(4) Are all or any of the above, or other methods of beneficiation within permissible limits of cost?

(5) How far can a market be found in Ontario for beneficiated Ontario ores?

(6) Is there a market for more than the present pig iron product of Ontario? If so, where?

(7) Can the problem be attacked by adapting a method of reduction to low grade ores, rather than by treating the ores so as to make them amenable to present blast furnace practice?

(8) Any aspects of the question not enumerated above.

This arrangement proved to be well-suited to the need. By means of it and by virtue of the adroit guidance of Mr. Mills, who is an unusually capable chairman, the effort of this gathering of men representing heterogeneous interests was made to focus on the aim common to all — the use of our own iron ores.

The Extent and Nature of Ontario's Iron Ore Deposits.

The discussion of the extent of the iron ore deposits so far discovered in Ontario was merged, naturally and perhaps inevitably, with the second question, their character. Mr. C. W. Knight, Assistant Provincial Geologist, led off with a clear and concise resumé of the geological conditions under which the various deposits have been formed, dwelling mainly on those differences in their character that are due to the geological age or epoch during which they had their origin. Mr. Knight also pointed out the well-marked differences between the productive ranges of Minnesota, Wisconsin and Michigan and the unproductive ones of Ontario — differences that were, in the main, overlooked by the earlier explorers and geologists, and that were forced upon their notice chiefly on account of the otherwise inexplicable lack of merchantable ore in Ontario. It is, by the way, this lack of discernment (or perhaps it might better be called prescience) that renders so many of the pronouncements of twenty years ago on our iron ranges, of little or no value today. Their similarity to the ranges of the United States was pointed out, but not the difference.

Dr. W. H. Collins, Director of the Geological Survey, Ottawa, followed with a comprehensive outline of the province's iron ranges, with especial reference to the kinds of ore-bearing material that they contain. Dr. Collins has during recent years spent several summers in the field studying the very problem; so his judgment is well-seasoned, and he speaks with more authority or the matter than is possible to any other geologist in the Dominion. Apart from the deposits of magnetic iron, which are of igneous origin, and are rather more widely scattered and of smaller size than similar ore-deposits in use elsewhere, our iron ore all occurs in sedimentary beds, now found mostly on edge. Thus we have, in the main, the truncated edges of iron-bearing strata to explore. These beds of iron formation are of such a character as to be almost impervious to the circulation of surface waters; and this, in conjunction with their high angle of dip, militates against the enrichment that has produced the economic deposits of the United States. In certain cases the circumstances of our iron ranges are similar to the productive ranges of the United States; and Dr. Collins is confident that extensive and systematic exploration with the diamond drill on those ranges will result in the discovery of similar ore-deposits.

In this connection there was a considerable amount of discussion with regard to specific iron ranges, presented mainly by those interested in them. Mr. T. B. Caldwell, of Perth, described the conditions that at present prevent the use of ore from the iron range at Temagami. Mr. Caldwell was, by the way, one of those who effectually aided the chairman in steering the conference clear of the rocks of dissension and the whirlpools of discussion that beset its course. Mr. Dreany, of Sault Ste. Marie, gave some details of the iron range in Michipicoten District in which he is interested, and a new nodulizing process now in course of development, which he expects to be successful. Mr. H. C. Cox, of Port Arthur, who has guided the course of the Moose Mountain experiment during its latter (and most successful) period, gave very interesting and impressive data about his deposits of ore. The vast bedded deposits of the Belcher Islands, low in phosphorus and sulphur, but

comparatively high in silica, were described, and their future use discussed.

Processes for Beneficiation.

To introduce the subject of beneficiation, Mr. Mills had asked Mr. G. C. MacKenzie, Secretary-Treasurer of the Canadian Institute of Mining and Metallurgy, to prepare a statement of what has been accomplished to date. Mr. MacKenzie's resumé was both lucid and comprehensive, and forestalled a great deal of discussion that might otherwise have consumed time with no good effect. Briefly, his conclusions are that the magnetic ore deposits of Eastern Ontario are too small and too widely scattered to stand the cost of concentration, and still compete with Lake Superior ores; that sintering is preferable to nodulizing in the agglomeration of fine magnetic concentrate; and that any process of beneficiation will succeed commercially only if operated on a very large scale.

In this connection both Mr. MacKenzie and Mr. Caldwell referred to the Eustis process for the "direct" production of steel from ore. Both had had a warm recommendation of the process from Mr. Bradley Stoughton, of New York, one of the foremost authorities on iron and steel on this continent. Mr. Stoughton considers that the electrolytic assault upon the electrothermic reduction of iron offers an opportunity of commercial application that is particularly suited to Central Canada, with her abundance of power and scarcity of carbonaceous reducing agents.

Mr. Cox described, in brief, the latest development in the production of sponge iron, as worked out recently by two young researchers of the United States Bureau of Mines. These results have not yet been made public; but Mr. Cox is hopeful that the new discoveries will go far toward bridging the gap that now separates the experimental work on sponge iron and its commercial application. He pointed out, what is of prime importance in Ontario, that the fine magnetic concentrate from our ores would form an ideal material for such a process, and that the use of raw concentrate would cut out the present high cost of agglomeration for use in the blast furnace. Mr. Cox also pointed out that the problem of producing merchantable ore at Moose Mountain has now, to all intents and purposes, been solved, and that what remains to be done is to establish such a connection with the users of ore as will warrant investment in a commercial plant.

The Cost of Beneficiation

When it comes to a question of using ore, it is the furnace manager's dictum that rules. Consequently the account by Mr. J. D. Jones, manager of the Algoma Steel Corporation of his recent investigations into the manufacture and use of beneficiated ores, and his conclusions, touched the heart of the discussion. The Algoma Steel Corporation has been foremost in Canada in making and using such ore, and Mr. Jones is in an exceptional position to judge of its commercial utility.

Some months ago Mr. Jones set out to determine at first hand what has been accomplished elsewhere on this continent in the concentration and agglomeration of iron ore. He visited a number of plants in the central and eastern United States, and his brief recital of what he saw was most informing. One important development that he noted is that the production of high grade concentrated ore from the low grade material available along the Atlantic coast has now exceeded Lake ore from that market, and promises also to exclude the cheap ore of Cuba and Brazil. Mr. Jones's conclusion in regard to Canada, and this is worthy of more serious attention than any other utterance at the conference, is that suitable processes for beneficiation can and will provide Ontario ore for Ontario's furnaces, provided the problem is attacked with energy and discretion.

The Market for Beneficiated Ores

At various times during the conference, the quality of beneficiated ores was discussed, and their suitability for use in the blast furnace. The information elicited from those with direct evidence was that sinter, nodules or briquettes, properly made, are completely satisfactory, and are most desirable ore. Magpie Mine nodules are known to have a preferred market, due both to their useful form and their desirable chemical constitution. Sintered magnetic concentrate is now one of the standard varieties of iron ore. Grondal briquettes, such as are turned out by the Moose Mountain experimental plant, are less firmly established in the markets of this continent; but their desirability is unlimited. Mr. Cox told of buying during the war time shipments of briquettes almost pure from oxide, as far south as Tennessee, at prices that were high even for those times. There was a shipment made to a Canadian furnace that was anxious for briquettes, but unfortunately bonded; but tests actually made in connection with all experimental work, as subject, and many which no experimenter can escape.

Another point on which the evidence of the members present was clearly informed by the experience of [illegible] was the blending of ores to produce the various qualities of iron wanted. The [illegible] ores, for instance, necessarily [illegible] of the chemical constitution of each kind of ore used, and [illegible] uniformity throughout each of the [illegible] grades. The iron ores from all the mines in Ontario [illegible] blended to produce certain standard qualities of pig iron. [illegible] manager decides months ahead what proportions of each of these varieties of blended iron will be proper for the coming year. The steel plant at Sault Ste. Marie, [illegible] for instance, requires a sulphur [illegible] necessary [illegible] varieties, which, when blended in various proportions, will give foundry iron, basic iron, [illegible] various uses they will require during the ensuing year. It will be readily seen that to provide this uniform mixture of any of the sorts required, from mines in Ontario and Quebec, to supply sufficient in quantity and uniform in quality, over a [illegible] years, is rather a large undertaking, and will require not only a very large outlay of capital for the upkeep [illegible] tion of the best brains that the province and the country can provide. But that the task can be accomplished, the sober judgment of Mr. Jones unequivocally affirms.

The Resolutions Applied

In order to induce an orderly consideration of resolutions, Mr. Mills suggested, quite early in the proceedings, the appointment of a resolutions committee, whose duty it would be to present the consensus of opinion as tabulated [illegible] at the end of the conference. When Mr. MacKenzie presented the resolutions that he, Mr. Clifford and Mr. Cox had drawn up, they represented, as was pointed out by [illegible] chair of the gathering that no change were necessary, and no discussion of consequence was provoked. The questions [illegible] the resolutions were considered, seriatim, with the following result:

1. The known and probable ore reserves [illegible] indicated can provide sufficient [illegible] our blast furnaces, and it is [illegible] likely that extensive exploration will disclose commercial deposits of ore [illegible] not require concentration.

2. Needs no answer.

3. The present methods of beneficiation are satisfactory, and both nodulizing and briquetting are suitable [illegible] are recommended.

4, 5, 6. A conclusion on these questions is beyond the scope of the present conference, and there should be considered by a special committee or commission, the appointment of which by the Government the conference recommends.

mends, the commission to be composed of a geologist, a blast furnace operator or metallurgist, and a representative of transportation interests.

It is this last recommendation that reaches the heart of the problem, as was immediately pointed out by Mr. Mills. The question of costs and of practical ways and means of applying the information now available constitutes the immediate problem, and this problem can be solved only by the intensive work of the best-informed authorities that can be had. In answer to a question, Mr. Mills said that of course the services of these authorities would not be asked for without remuneration, and that he was confident that his colleagues of the provincial administration would provide adequate means for this purpose.

An additional resolution, not brought in by the resolutions committee, was on the much-debated question of a bonus for the production of iron ore. As drafted, this resolution requested aid from the public purse for the iron ore operator in Ontario, the manner of dispensing this aid being left open.

Vote of Thanks to the Minister.

After a day fruitful of well-informed discussion and resulting in a series of well-balanced resolutions, acceptable to all and particularly suited (as it turned out) to the prime mover of the conference, Mr. Caldwell tendered to the Hon. Mr. Mills the thanks of the meeting, not only for his initiative in calling the conference, but also for his care and discretion in guiding its destinies. Mr. Mills richly deserves all the credit that can be accorded him for this forward step in Ontario's iron ore problem.

A Symposium On Low Temperature Carbonizing of Coal

ABSTRACTS FROM PROCEEDINGS OF THE SOUTH WALES INSTITUTE OF ENGINEERS, MAY 16, 1922.

OPENING STATEMENT BY DR. C. H. WANDER, REPRESENTING THE FUEL RESEARCH BOARD

The experimental work of the past two to three years has for the first time placed in our hands trustworthy data on this subject... These data will, we hope, serve to correct some of the loose and unsupported statements which have been handed on from report to report without corroboration. At H. M. Fuel Research Station we are now in a position to make tests and to pronounce with confidence as to the suitability or otherwise of any given coal for carbonization at temperatures from 500 deg. C. to 650 deg. C., and to determine the proportions in which the more and less fusible varieties of coal should be blended in order that the most satisfactory results may be obtained.

As the direct outcome of this experimental work, low temperature coke has been regularly produced on a works scale in the form of cakes which are sufficiently robust to stand the rough handling of transport. The cakes are cleanly and economical in use, are more easily kindled and kept alight than the raw coal from which they are produced, and their combustion is absolutely smokeless. This is an industrial method, and will stand or fall on a perfectly definite issue, which is whether or not it is possible to evolve an apparatus on sound engineering lines in which the capital and working costs will fall within the modest margin of working profit on which this industry must be founded...We have from the outset recognized that the solution may at any moment be reached by the genius of an outside inventor, and we have therefore devoted much time to the study of all proposals which appeared to contain the germ of possible success.

Broadly speaking, there are three distinct lines on which carbonization may be attacked:—

(1) The crushed coal is exposed in thin layers in a gas-tight chamber to the action of heat which is passed through the walls of the chamber from an outside oven or combustion chamber, and is distributed through the mass by conduction, radiation and conviction. The layer of coal is not mechanically turned over for the exposure of new surfaces to the action of heat during the period of carbonization.

(2) The crushed coal is exposed to heat in an externally heated gas-tight chamber in which it is mechanically stirred and turned over so that new surfaces are exposed to the heat conducted from the walls of the chamber.

(3) The crushed coal is exposed to the action of heat derived from the sensible heat of a large volume of producer gas which is passed over and through the mass. The gas is either generated by the combustion in a mixture of air and steam of a proportion of the coke which results from carbonization, or is generated in a gas producer fed with an independent supply of coke.

From the first and second of these methods...the quantities and qualities of the volatile products, gas, and crude oil from any given coal need not vary much from the established standards. The physical and mechanical properties of the coke, however, do vary over wide limits, and may greatly influence its suitability or otherwise as a domestic fuel.

In the third method certain entirely new considerations are introduced, the chief of which is the alteration in the quality and quantity of the resulting gas. Instead of the 3,000 to 3,500 cubic feet of gas [per ton of coal] with a calorific value of 900 to 1,000 B.T.U. per cubic feet which results from the first and second methods, the third involves the production of 20,000 to 25,000 cubic feet of gas of a calorific value of about 230 B.T.U. per cubic feet. There is a corresponding reduction in the yield of coke.

The addition of briquetting to the present preliminary preparation of grinding and blending would, we believe, go far to simplify and cheapen the subsequent operation of carbonization.

NATIONAL IMPORTANCE OF LOW TEMPERATURE CARBONIZATION.

By David Brownlee, B.Sc. Hons. (London), etc.

(Abstract)

The burning of raw coal is a barbarous, unscientific and uneconomical proceeding. During the combustion of raw coal it is almost impossible to prevent the escape of volatile products in the form of black smoke and other unburnt material.

By carbonization in closed retorts, a whole series of valuable by-products can be extracted.—motor spirit,

"Diesel" oil, lubricating oil, fuel oil, sulphate of ammonia, etc.,—which are otherwise consumed as mere fuel. In addition, the residual fuel is a much better fuel than coal, burning smokelessly and with a high emission of radiant heat.

Only 20.2 per cent. of the coal consumed in Great Britain is carbonized by the high temperature methods, the gas works and the coke oven, the other 79.8 per cent. being used as raw coal.

Taking the 149,500,000 tons of coal now used as raw fuel, the net saving by the utilization of low temperature fuel would be about 75,000,000 tons per annum. In household fuel alone, 15,000,000 tons of coal would be saved.

The universal carbonization of our raw coal by low temperature methods would wipe out once and for all the black smoke trouble, with a consequent saving to Great Britain of over £40,000,000 per annum. If fuel contains less than 12 per cent. volatile matter it is completely smokeless, because this amount has time to burn properly.

The British Empire has no oil of any importance, and we are practically dependent on other countries for motor spirit, "Diesel" oil, and lubricating oil. The world's output of oil is approximately 700,000,000 barrels of which the United States produces over 60 per cent. and controls over 80 per cent., whilst the British Empire produces about 2½ per cent. and controls about 5 per cent. We import about 200,000,000 gallons of petrol per annum, and the price is so high that the British industry is crippled.

The low temperature carbonization of the 149,500,000 tons of coal available would give over 500,000,000 gallons of motor spirit and 75,000,000 barrels of oil, which would render us independent of the rest of the world. This would also enable us to develop to the fullest extent the economical "Diesel" engine, which is infinitely more efficient than the condensing steam engine or turbine.

Finally, low temperature carbonization will give us an ample supply of fixed nitrogen (sulphate of ammonia) for the proper cultivation of the soil. We grow only about one third of the food we eat. We cannot go on forever paying millions of pounds per annum to foreign countries for food, when we have millions of men and women out of work and millions of acres of land lying uncultivated.

LOW TEMPERATURE CARBONIZATION OF COAL.

By S. Roy Illingworth, M.Sc. (London), etc.

(Abstract)

From one angle it is an altruistic conception, but unfortunately financial considerations enter into it. Does it pay? So far it does not. It is useless to think of costing a process on any other basis than the rock bottom price of its products. In this case we cannot expect more than say, 17s. 6d. per ton at the works for the fuel, and more than 4d. per gallon for the oils, since such must ultimately become the general prices of this country is to continue as a going concern.

The difficulties that have beset carbonization in the past are the long period of carbonization and the unmarketable quality of the fuel due to its friability, and of "oils" due to their mixed condition.

Coal is known to consist of four main types of substance.

The alpha compound, devoid of coking properties, gives rise in carbonization to negligible quantities of hydrocarbons. Its gaseous products are carbon monoxide and hydrogen. It does not decompose below 300 deg. C., and remains practically untouched in the general low temperature carbonization.

The gamma compound is the cementing ingredient in coal. On carbonization it gives rise to large volumes of paraffins and naphthenes. It melts and confers plasticity on a heated coal. All forms are decomposed below 500 deg. C., certain forms below 300 deg. C.

The beta compound has no cementing property; it does not melt; on carbonization it gives rise to oxides of carbon, water, phenol, but little hydrocarbon.

The ulmin compound is highly oxygenated; it gives rise mainly to oxides of carbon and water. Its occurrence in bituminous coal is negligible.

The various types of coal are conditioned by the amounts of the four ingredients and by the relative amounts of the various types of beta and gamma compound. The formation of coke structure arises by virtue of the thermal decomposition of the gamma compound.

[Increase of volatile constituents makes necessary a treatment in two or three stages. "Carbonaceous" and low volatile bituminous coals are one-stage coals.]

We have only a small stock of one-stage coals suitable for low temperature carbonization. I have converted over forty different two and three stage coals into one-stage by preliminary treatment, and have obtained sound, hard smokeless fuel. The yield of oil varied from 14 to 28 gallons per ton, according to the nature of the coal, and the gas yield amounted to from 2,500 to 3,500 cubic feet per ton. A commercial unit is now in course of construction.

NOTES ON THE MACLAURIN CARBONIZATION PROCESS

By Maclaurin Carbonization, Ltd.

(Abstract)

In general proportions the Maclaurin plant is similar to the blast furnace, but on a lesser scale.

Coking and distillation are done entirely by the hot gases formed in the lower parts of the producer, due to the combustion of a small portion of the fuel. These hot gases pass upwards, gradually heating the coal in the upper layers and carrying with them the oil vapours given off. In contact with the colder fuel being charged into the plant at the top, condensation of the oil takes place, and by an ingenious trap the oils are carried off. The fuel after being stripped of its oil passes down into higher temperature zones, and after a period of cooling is withdrawn.

The smokeless fuel produced, formed at about 700 deg. C. contains only about 4 per cent. volatile matter. The heat losses are small. The oil contains almost no light oils. It can be used direct as a fuel oil. The scrubbed gas is free from stringy tars and ready for industrial use. The yield of ammonia when running for coke is 24 lbs. per ton. On several large tests the loss on coal containing 27,552,000 B.T.U.'s was represented by only 3,104,343 B.T.U.'s or 11.3 per cent.

A reward of £10,000 was offered in January 1920 by the Australian Commonwealth Government for the discovery of oil in commercial quantities, provided the applicant reported to the Government within two weeks of commencing boring. No payment was to be made until oil to the amount of 50,000 gallons was obtained, and the well was still flowing freely. In September 1920, the reward was increased to £50,000. In April 1920 the Department of Mines of South Australia offered a reward of £5,000, stipulating the production of 100,000 gallons. The Department also offer a bounty of £1 per ton on the production of graphite. [illegible] All three offers still hold.

One Of Nova Scotia's Leaders

THE HONOURABLE ROBERT DRUMMOND

The Hon. Robert Drummond, of Stellarton, spent a week in Cape Breton lately. His many friends were delighted to see him and not a few of them vied with one other in showing their liking for him. Mr. Drummond is eighty-two years old, or I should say *young*, for he will never be old. His outlook in life is that of those who believe "the best is yet to be."

A youthful, buoyant spirit, with a love of quiet fun, and a bubbling fountain of Scottish wit and humour, is just what makes Mr. Drummond the delight of his friends and the life of all company, public or private, wherever he finds himself. Of course behind all this is his sterling character, as unchangeable as the Grampian mountain range of his native land. And added to this is fifty-eight years of able public service, during which time he has been one of the greatest forces for progress, peace and sweet content in his adopted province of Nova Scotia.

Men in all walks of life and in many parts of the Dominion are proud to state that they owe their first inspiration to succeed in their various callings to Mr. Drummond. His life and example have been ever a stimulus for good, and all the more so because of his restless energy and untiring efforts in the pursuit of high ideals. His is a personality that has impressed others and spurred them on to do their best.

For the stormy life of a Labour Leader, he has been by nature pre-eminently fitted. He possesses all the necessary qualities for leadership,—courage, caution, foresight and wisdom, with a magnetism born of a large nature. And, when after nineteen successful years of such leadership, during which time he infused the mine workers of Nova Scotia with progressive ideas and led them to higher standards of living, he threw off the harness of Leader, it was only to continue, untrammeled, the work as an educator and moulder of public opinion which, as an editor, he had taken up almost simultaneously with that of General Secretary of the Provincial Workmen's Association.

For forty-eight years he has sat in the editorial chair, and has given the best of a mind clear, keen and forcible, through a pen that flowed facile over a page sparkling with wit, and playful with pawky humour, while incisive in logic and most convincing in argument. He always courted combat, and more than lucky was the antagonist who escaped unscathed from the point of his piercing rapier.

The mellowing influences of a long life and large experience coupled with unabated intellectual force, has largely added to the liquid tones of his later journalistic writing; and while these have lost nothing in force, they have greatly increased in flavour, and as the half-century mark is being approached, their captivating charm binds his readers closer and closer to him.

As a close personal friend who for upwards of forty years has had his personal guidance, I can do no better than quote our own poet Burns:

> The friend of man, the friend of truth,
> The friend of age, the guide of youth,
> Few hearts like his with virtue warmed,
> Few heads with knowledge so informed.

In the Legislative Council of Nova Scotia, of which he is an honoured and esteemed member, the advice of Mr. Drummond is eagerly sought after and willingly given. He is a keen debater and is always ready for a friendly tilt. A little over two months ago, he had the pleasure of listening to a glowing tribute by Premier Murray, in recognition of the great work accomplished on behalf of Nova Scotian miners by the moderate spirit and persistent

effort of the Provincial Workmen's Association. And he could, if he were travelling around, hear similiar plaudits almost every day, in view of what is being said and done in the colliery districts at the present time. To have lived a long, useful, helpful, wholesome life, is surely a great achievement and one that brings its own reward.

But in case some who do not know Mr. Drummond may be inclined to say that this is being "laid on with a trowel," let us look in at the Mining Society, which recently met in Sydney, and we shall see that there is here no exaggeration, and that only a small portion of the truth is being told in this short sketch.

Mr. Drummond was one of the most enthusiastic members present. Full of optimism, seeing visions as young men do, he is without that conservatism common to persons of advanced years. His speeches warmed and cheered, and while his pungent witticisms provoked much

mirth, his words of wisdom fell on retentive ears, and it was plainly seen that he was the idol of the Society's members. The genial and warm hearted mining secretary, E. C. Hanrahan, near the close of the meeting gave expression to the feelings of all present, when in a few kindly remarks he said. — "No meeting of the Mining Society would be complete without Mr. Drummond. The longer I know him, the more I love him. He grows on me as the years go by. I admire his great courage, his sterling qualities; and one of his striking characteristics, with which I have always been strongly impressed, has been his love of a fair fight and his most forgiving spirit after it is over.

I love to meet him and to hear him, and I trust he may long live to take his place at our meetings as one of the most honoured and most useful members of the Society." And we all heartily applauded these sentiments. And when that grand old Scottish, but now universal, anthem, "Auld Lang Syne," was still pouring forth from leal hearts and true, eight or nine coal and steel stalwarts could be seen silently stealing towards Mr. Drummond, and in a twinkling he was in mid air, and the song changed into prolonged cheers for one of the grand old men of Nova Scotia.

News and Comments

By ALEXANDER GRAY

Value Of Sullivan Mine

When the writer recently described his visit to the Sullivan Mine of the Canadian Consolidated Mining & Smelting Company, at Kimberley, B. C., he stated that the hypothetical quantity of ore proved and indicated was approximated at 5,000,000 tons, with the possibility of more. This off-hand estimate was that of an operating executive. It was intimated at the time by a Director that it might have been pertinent to venture a calculation as to the value of this ore in place. To have done so would have been foreign to the purpose of the visit, and would have injected a speculative factor that might be misinterpreted. However, as the Bond Brokers who arranged the financing of the East Kootenay Power Company, with a view to serving the Consolidated establishment at Kimberley, have struck an optimistic note, it is entirely fitting that the statement that the value of the Sullivan Mine "is estimated at about half a billion dollars" should be analyzed.

The writer was content to record the fact that the Sullivan certainties and probabilities were worth several times the capital liabilities and commitments of the Consolidated. Undoubtedly it was uneconomical to ship ore to Trail when a concentrator on the spot would mean a greater saving in freight. However, that is about to be remedied, and cheaper power and enough of it will be forthcoming, so the question recurs whether the Sullivan is worth half a billion dollars. To ascertain this it is necessary to consider the average of all the tonnage that has been shipped during the past two years. If the tonnage of the zinc and lead content continues to average twenty or twenty-five per cent of the grand total of the ore as estimated (roughly this is true) then five million tons of ore will represent one million-and-a-quarter tons of metals combined. Assuming it to be 2,000,000,000 lbs. of zinc and lead in place, a seventy or seventy-five per cent extraction leaves it for lightning calculators or experts with a multiplication machine to determine what those metals may bring in world markets. Every billion lbs. of the metals will make it more conclusive that the Sullivan is an asset of such dimensions that present-day truth may be much below the mark five years hence. That is why it is injudicious to indulge in cyphering concerning the Sullivan. Most published estimates can be quartered; and even then the Sullivan will have solace for shareholders, and heart burnings for other producers of lead and zinc.

Handicapping Gaspé Lead-Zinc

While on the subject of the Sullivan Mine, it is pertinent to reproduce this from the Report of the Quebec Department of Mines for 1922:

"The Federal Zinc and Lead Company, Limited, carried on further development work on their mine in Lemieux township, in the region of the headwaters of the Cascapedia river, in Gaspé, and moreover worked on the construction of the road to connect the mine with the railroad at the station of Cascapedia, near New Richmond.

"The underground development work at the end of the year stood as follows: depth of No. 1 shaft 257 feet; length of drifting 1088 feet, total crosscutting 880 feet, levels opened up at 160 feet and 250 feet. These workings have blocked out a large amount of very good ore. Two other shallow shafts have also been sunk from the surface, 61 feet and 18 feet respectively. The lack of means of communication greatly militates against the more rapid progress of this mine, and to this drawback may also be added the depression of the metal industries, which has prevailed during the past two years".

There we have official confession—but no repentance. Having done between two and three thousand feet of development, determined the presence of a large tonnage of excellent commercial ore, and endeavored to construct a road, Directors of the Federal company find themselves refused assistance in the matter of transportation. The Quebec Mines Department is alive to the needs of the situation and the disabilities of the company, but the over ruling edict is to the effect that the Federal company have to do with an abhorrent mining proposition—no matter how meritorious in the economic scale. Ontario is building roads to prospects of less consequence, and British Columbia would not and does not hesitate when road making is warranted.

To most users of coal as fuel, the question of powdered fuel is always a live one. Hence the latest catalogue (No. 1) of the Grundle Fuel Equipment Co., Harvey, Illinois, will prove of interest to many ferrous metallurgists. This illustrated brochure of 10 pages sets forth in detail the plan and construction of the equipment used to crush the coal, remove stray iron, dry the lumps, and pulverize the coal, then storage, hoppers, conveyors, feeders and burners are dealt with. In common with other pulverized fuel systems, the Grundle system claims a great economy in the use of fuel and operating cost. Its special claims to attention are demonstrated by a considerable number of successful installations.

A process for the production of potash and aluminum from feldspar by treatment with sodium carbonate has been patented by Harry P. Bassett. A very pure aluminum hydroxide is produced, according to the patentee's claim.

Preaching Without Much Practical Performance

by ALEXANDER GRAY

As an ultra-conservative newspaper — admirable, in a way, as such — *The Montreal Gazette* has conscientious scruples concerning the mining industry and maintains a policy of aloofness. Its reasons therefor, no doubt are epitomized in this extract from a leading editorial appearing in the Dominion Day issue:

"Mining schemes are a favorite device of the gamesters, and seldom fail to gather in the hard-earned dollars of the simple folk. The very fact that mines have made millionaires furnishes promoters with their strongest card, and causes perennial crops of sharks, having no other asset than a claim, and no money other than gullible people give them. Minerals, whether coal, iron, oil, precious metals or other, are a great national asset, an asset Canada possesses in abundance, but all is not gold that glitters, nor does a claim signify a mine. Mining is the most hazardous of risks. It usually means loss of the money put in, but a prize is sometimes captured, and the chance of a prize is the irresistible bait. There are sound, well-managed, profitable mining concerns in Canada, and if one desires to gamble on a chance he will find fair prospects at home without going abroad, but the sagacious person before risking his money, little though it may be, will seek advice, and in no quarter will better advice be obtained than from his banker."

In the foregoing there is considerable of fact and more that may be taken as the academic view of those who would eliminate the "mining risk", or leave it for the foolhardy to assume the hazard.

Influential newspapers lay flattering unction on themselves that they are absolved from skulduggery as practiced by "sharks", by their declining to permit a certain amount of publicity. They deem it to be a virtue to refrain also from what would be corrective and, therefore, constructive. Their generalization that "mining is the most hazardous of risks", that "it usually means loss", would not be so widespread in its application if really well-intentioned newspapers recognized that mining, no less than farming, is the conjoint basis of national wealth and progress. Too literal acceptance of the *Gazette* editorial dictum would preclude or retard the exploitation of those "assets" in "minerals, whether coal, iron, oil, precious metals, or other".

Owing as much as anything else to the hazy view obtaining with the daily press regarding mining industrialism, and since a recrudescence of over-speculation in nondescript shares was threatened, *The Canadian Mining Journal* began a crusade against what would undermine the well founded confidence there is in the very assets which the *Gazette* would promote (but is apprehensive lest it lean too far forward, whereas there is safety in leaning backward). And yet it is inadmissible that "the sagacious person" should seek immunity with and always accept the decree of "his banker." Where there is chronic antipathy toward mining, it follows, as J. Poindexter, colored, remarked, that they "look at w'ite affairs from a cullid stan'p'int".

Manifestly head-office and branch authorities are no more omniscient than those whose chosen profession it is to separate the economic wheat from the chaff. So long as mining is Gilbertian "too too", and utterly "hazardous" in the estimation of press and bankers who have no means of determining the merits or demerits of mining enterprises in any form, just so long will the real mission of our great natural assets be "mummuxed".

Making the mining sciences suspect, inevitably prevents participation in legitimate ventures of those who respect the judgment of newspapers and bankers, and places propositions all too frequently at the mercy of "sharks", who as frequently appeal to the public through the advertising columns of the otherwise well-censored press. While the *Gazette* is scrupulously careful about accepting advertisements of doubtful character, even it has fallen from grace betimes, as the pages exploiting the *"North Trail"* and space devoted to *"A Pool"* attest. However, newspapers as well as the generality of mortals are fallible, and that has a great deal to do with misadventures, unrelated to bona fide mining. Without mining, our common carries would have more steaks of rust, and the banks might have to find a way to branch out in the farm mortgages that were the vogue before the mines of the West supplemented precarious home markets for products of the soil.

Following the tenets laid down by the *Gazette* there would have to be an exodus from lunatic asylums before the sane could be convinced there are mining "hazards" worth taking. It is not the fault of mineral resources that every one of them discovered and developed in Canada was at one time or another involved in doubt, if not in discredit, inside and outside newspaper offices and banks. Begining with the Maritime iron and coal deposits, taking up the Ontario steel plants, including the Asbestos Industry, recalling what happend to the Nickel companies, going all the way to Trail, returning via that greatest of "hazards", the Transcontinental Railway, to Cobalt Porcupine and Kirkland Lake, it was derelictions on the part of humankind and the mediums of expression that created misconceptions in newspaper offices and banks.

Were it not for products of the mines—the execrated mines—there would be fewer banks and less advertising. Recurring speculative orgies are charged to mining, whereas the educational forces of the press and banks, when measured by the rule of reason, will obviate the mischief complained of. Not all the mischief. Every year there is harvested a bumper crop of "boobs", otherwise sapient unto their day and generation. As the aforesaid J. Poindexter, colored, remarked of certain New Yorkers he had met; "bright as they is in some reguards, they is the most ignorant in others ever I seen". Yet the Great Adventure, as Rickard characterized mining, will proceed, and wealth stored in the ground will be disseminated with more beneficial results than the wholly and solely admonitory seem to realize. Canadian publicists and high financiers unwittingly deny to mining its proper status. Once I asked the Laird of Skebo, Andrew Carnegie, where would be the greatest industrial center in the United States. The grizzled little genius replied:

"Wherever fabricating plants can be established closest to the essential raw materials and distribution is possible to greatest advantage".

Singularly enough, Mr. Carnegie did not consider Pittsburgh the future seat of industrial empire in the United States. What it possessed in convenient coal fields, it lacked in iron ores and cheap transportation. It is poor strategy to forego mining basic materials and have a "proxy" steel industry in central Canada. Acquiescence in the contention that Canada cannot compete with the larger steel works in the States, is a libelous confession of judgment that should not be sustained. Nor will it be. We have progress at Hamilton and the Soo, and the British Empire Steel Corporation is reported to contemplate an expendi-

ture of $19,000,000 upon additions and repairs. New open hearth furnaces and a blooming mill are to cost $10,000,000, it is said. No doubt the details of this development will be announced in the near future.

In Nova Scotia we have the greatest mining and fabricating corporation in Canada; but Canadians appear to be unaware of it, and spokesmen of banking and business interests even deny the possibility of making the iron and coal deposits of the Maritime Provinces function as Mr. Carnegie said they would, when they are in close proximity and distribution is economically attainable. Granting that those deposits have adduced commingled confidence and confusion, it is no proof that the expansion planned is not going to fortify our industrial eastern frontier and accomplish what was only feebly attempted all these years. Obscured by what is too obvious to require re-iteration, the potentialities of the basic materials on our seaboard worth the amount of our National Debt are about to provide more than mining miasma. And the irony of current events is that American banking firms are to provide the funds. Incidentally, it is no secret that it was a Canadian prominently identified with our own steel and coal industry who last month was delegated to determine exactly how to round out a steel plant in the States and at what cost.

Canada urgently needs the impetus derivable from wholesome mining. Without the $400,000,000 extracted from the Comstock Lode and its collaterals, Pacific Coast States would have had more of the *dolce far niente* than was at all delectable. Railroads were projected and completed during mining "booms", and there are no apologists for what happened. Periodically the California, Nevada, Utah and Colorado mining magnates have been accused of about every crime in the calendar; but they made something grow besides cactus and sage brush. If there was over-speculation, it was in miniature when compared with daily events in Wall street and elsewhere. Mining money gave "zip" to the colonization of the West, including British Columbia.

Enough of this, however. The daily press confuses the issues by presuming all mining in its initial stage to be excessively hazardous. The remedy for much of what obtains by way of suspicion and condemnation, rests with the press and with authorities who might deter vendors and promoters from over capitalizing the "Almost" mines, over estimating prospects, and imposing too heavy a first charge upon the public. Mineral industries must be a runner-up for agricultural industries. Embargoes upon Canadian cattle, imposts upon our wheat and the generality of products of mine and the land; so many complications confront us, it is penny wise for the platitudinous to proclaim that "the truth is not in" mining men, that all mines "usually mean" this, that or the other thing. While there is commercial activity there will be speculative activity. Canada as a whole is in the *prospect stage*. When it has more iron mines, more producers of precious and base metals (unaccompanied by furore or tol de rol if you will) it will be less of an "Almost" factor in the galaxy of nations and their metal markets. Alongside the philippines against mining is this abbreviated survey:

"Canada knew little of her rich mineral wealth in 1867. To-day production has risen to $217,000,000, including practically every known mineral except tin. Fifty three years ago there was no silver from Cobalt, the nickel of Sudbury, the coal worlds of Alberta, the gold of the Yukon and Northern Ontario had not been discovered. And yet only a fraction of the mineralized areas have even been prospected."

It is an accepted truth among the most discontent that "there are sound, well managed, profitable mining concerns". That being among the "small favors thankfully received", were they found without hazards? How long would we be in furthering mineral development if the branch manager had to pass upon prospects or "Almost" mines, and he had to await action by the head office and directors to decide? Wing the "sharks" by all means—but don't maim those whose adventuring is a prime mover.

Trained mining men and their principals, possessing or commanding capital, acknowledge Canada is the finest *prospect* before them.

There is one consolation about this discussion. *The Globe* of Toronto editorially admonished optimists not to "purchase" their gold "too high", fearing share-market inflation. *The Star* led its editorial page with a declaration of war against "Sharks". Now the *Gazette* has indulged in editorial reminder of the "most hazardous of risks". Having emphasized the precautionary aspects, what can be done to create affirmative sentiment that Canadian mineral resources are all sufficient inducement for sanely-organized enterprises? We know there is American money awaiting Canadian opportunities. The Canadian capitalist is confronted with "Beware" signs; yet we have $19,000,000 more going into British Empire Steel expansion, more millions being devoted to Consolidated Mining and Smelting expansion, and American and oversea British capital seeking Canadian precious metal areas. Our newspapers might well afford to take a positive, instead of a merely negative, stand in this important question.

THE ASBESTOS TRADE

Asbestos and Mineral Corporation, New York, have issued the following to clients:—

There has been a decided improvement in the demand and consumption of shorter grades of asbestos fibre. While the demand for longer grades is not quite as brisk, there is a perceptible improvement. All the Canadian mines, with but a few exceptions, have resumed or are about to resume operations, and prospects for the asbestos industry are much brighter for the last half of the current year.

The prosperity of the asbestos industry for the past twenty five years has gone hand in hand with steel, iron and other basic industries. The sun has evidently commenced to shine on steel and iron, and our business is also beginning to get a few rays of sunshine. We venture to predict that by the end of the year, the depression clouds will disappear entirely.

We believe that the recent downward revision of prices has about reached the lowest point commensurate with present costs of labor and supplies. Believing that there is a gradual resumption of activity in general lines and the automotive and building trades in particular, we forecast a higher scale of prices for those grades in demand for these purposes in the near future.

During the eleventh week of the coal strike, June 12-17, the production of soft coal was 1,986,000 tons of anthracite coal and 22,000 tons of anthracite. This is about 6,000,000 tons below the weekly norm.

The United States Geological Survey estimated that the world's output of coal was 1,120,000,000 metric tons in 1921, a decrease of 200,000,000 tons as compared with 1920.

News of Mining

Great Britain

The Royal Dutch Petroleum Company and the allied Shell Transport and Trading Company have remarkable dividend records. The Royal Dutch paid 40 per cent. in 1920, the Shell Transport, 35 per cent. For 1921, the dividends total 37 per cent., and 21½ per cent. respectively. Shell Transport, since its formation in 1897, has paid dividends regularly, ranging from 2½ per cent. to 35 per cent., and totalling almost 500 per cent on its capital.

Coal production in the United Kingdom for the week ending June 3rd, amounted to only 4,441,000 tons. For the previous week it was 4,630,000 tons. The trans-Atlantic export business is being strongly pushed to relieve the congested condition of shipping ports.

Notices of reductions of wages have been posted in British collieries in accordance with the requirements of the Industrial Disputes Prevention Act. Reductions are to take effect on and after August 1st. Employees receiving 24s. per shift will then receive 22s., and other workers' wages will be proportionately reduced.

Considerable quantities of Welsh coal have been shipped from Cardiff recently, consigned to New England ports.

Europe

Rumanian oil exports during the first three months of this year were 93,000 tons as compared with 58,250 tons for the same period in 1921.

The potash output of the German Kalisyndicat during the first quarter of this year was 3,400,000 metric quintals of pure potash.

Spanish railways that are in any way subsidised by the Government are compelled to use domestic coal to the extent of 70 per cent. of their requirements.

Italy is the largest consumer of Rumanian petroleum, France next, and Turkey and Egypt following.

Australia

Before the year 1910, silver coins for Australian currency were minted in Great Britain. Since that year arrangements were consummated whereby the Commonwealth's silver coins were minted at branches of the Royal Mint in Sydney and Melbourne. The value of the silver coins issued during 1921 was £271,000. Although the price of silver was high, the profit to the Government was £63,000. The estimated profit for the current year is £100,000.

On June 3rd the nodulizing plant of the Mount Lyell Mining Company, Tasmania, was destroyed by fire. The loss would have been serious had it not been for the fact that a new Dwight and Lloyd sintering plant was completed and put in commission during May.

The Arbitration Court's adjustment of a reduction of one shilling per day in the basis wage of West Australian mine employees, mentioned before in these columns, is to hold for three years. This is not looked upon with favour by operators, who contend that the reduction may prove quite inadequate.

Africa

The Transvaal's output of gold during May amounted to 629,786 ounces.

The present equipment of the Geduld Proprietory Mines comprises 100 heavy stamps and eight tube mills, with a capacity of about 45,000 tons per month. The plant is now to be brought up to a capacity of 65,000 tons per month. Additions will include 40 stamps; five new tube mills of dimensions 6½ feet by 20 feet, and two new Gates crushers. Instead of 55 per cent. slimes produced at present, the new plant will slime more than 70 per cent of the ore.

The rapid rate at which natives have returned to work at the Transvaal gold mines has helped production markedly.

Natives to the number of 214,000 were employed during 1921. It is improbable that as large a number will be employed at any time this year.

Asia

The production of silver in Japan during March 1922 is reported as 154,912 ounces; of gold, 25,134 ounces.

The Geological Survey of India is authority for the statement that preliminary investigations of the iron ore deposits of the states of Bonai, Keonjhar, and Singhbhum, indicate the presence of about 3,000,000,000 tons of high-grade hematite. Sampling done to date has given extraordinarily high results. Apparently the ores carry low percentages of phosphorus, sulphur, and silica. One deposit worked by the Bengal Iron Company is reported to average 64 per cent iron, 0.05 per cent. phosphorus, 3 per cent silica, and 0.06 per cent manganese.

Under a recent agreement entered into between the Premier Oil Company, Limited, and the Indo-Burma Oilfields, Limited, the geologist of the former company has authority to select well sites not closer than 300 feet from sites of producing wells or those being drilled by the Indo-Burma Company. A joint arrangement as to expenses has been made between the two companies.

United States

The Utah Copper Company, which conducted operations for only the first three months of the year 1921, reports a net loss for the year of $2,058,108.

Appearing before the House of Representatives' Committee on Mines and Mining, Mr. Horace V. Winchell expressed himself as strongly in favour of the Arentz Bill, the purpose of which is abolition of the requirement for discovery before staking. Mr. Winchell, in the course of his evidence, stated that in his opinion the day of the prospector in the United States was past and that the future of mining would depend upon the work of large corporations.

Instead of the proposed import duties on potash, a bounty on domestic production is now suggested, for a five-year period.

Joint patents have been issued to Messrs. J. J. Denny and M.F. Fairlie on a process for the treatment of manganiferous gold ores. The process is based upon the use of metallic iron and sulphuric acid followed by treatment with cyanide.

The annual report of the Nevada Consolidated Copper Company shows a distinct lessening of costs in 1921 as compared with 1920. The item of steam-shovel operation for instance was reduced from 3.04 cents, the 1920 figures, to 2.77 cents per ton in 1921. The only segregated cost item to show an increase was that of drilling and blasting—6.14 cents per ton in 1920, and 6.45 cents in 1921.

Notes From Nova Scotia

A CAMPAIGN FOR CLEANLINESS AND ORDER

A General House-Cleaning

About three years ago, the Dominion Coal Company decided that it was not incompatible to combine business with beauty, order and cleanliness at the coal mines; so a decree was sent forth for improvement of appearances in and around the collieries. It was some little time before the workmen and all the officials could be persuaded that it was really necessary to spend time and effort in trying to make a coal mine look clean and orderly, especially when frequent wind storms scattered coal dust around in great heaps, blackening and covering up everything it lighted on. But it gradually began to be understood that cleanliness meant the removal of coal dust and all other debris so that wind storms might not have the black dust clouds to play with. A storm-swept colliery was usually after this a very clean place. The general clean-up had left nothing to toss about, so the improvement at the collieries began to impress itself upon the minds of the workmen and the officials.

Here and there, previous to the order of the Company, some workman, such as a stationary engineer, had exhibited a taste for potted plants within his building, while others had shown a fondness for climbing plants without. Other men had given evidence of the love of the beautiful, by the free use of paint on the walls and floors of the houses and on the bases and other parts of their engines.

The new day came in with the vitalizing breath of a spring morning when all life is animate with the joy of quickening forces. Like Roderick Dhu's warriors, springing from "copse and heath and shingles grey", there sprang up architects and artists, landscape gardeners and painters, and a transformation was wrought at the collieries and in the feelings of the workmen that had long lain dormant awaiting the master-hand of the magician. He had come and waved his wand and immediately a new heaven, if not a new earth, appeared. Everywhere one looked, the process of change was going on. Engine houses, both inside and out, were being repaired and renovated, the oil of years was scraped from black floors; windows were washed and pure sunlight admitted; while the roofs — the overhanging canopies which in many cases had become nothing but "foul and pestilent congregations of vapors" plus cobwebs, — were brightened up and made to shed a cheering influence on all beneath.

Dark, dingy stables, badly lighted and worse ventilated, were filled and flooded with free fresh air and sunshine. Miners' bath houses were remodelled and modernized. The light of day and modern science were turned into the dark corners of cellars and all other suspicious looking buildings, and from these was disgorged the rotted and dank accumulation of years. Bon fires were lit in every mine yard and kept burning until the last vestige of refuse was destroyed. Incinerators were placed at each colliery and now these reduce daily to ashes, the waste material of the mine.

Making Lawns and Gardens

After having been well cleaned up, the grading of the surface began. Hollows were filled and leveled, under-drains were put down and in many places fine coats of white dolomite from the steel crushers were spread over all, covering up the black mud, making the ground firm and clean for the feet of busy workmen. Wherever possible, squares of ground were graded and fenced in and sown with lawn grass.

Old weather-stained buildings began to take on a new appearance under the painter's brush. Black, ugly looking bankheads, glistened in the sun with their fresh coats of paint, tar or whitewash and the surrounding buildings and other objects, such as telephone poles, and pierhead pipe-lines, were touched up to suit the surroundings. And so the black colliery buildings and confused yards became things of order and of beauty.

But nowhere did the change become more apparent than in the workmen themselves. They began to vie with one another for honors in the bringing in of a new world. The men of the large power and compressor houses quickly developed a taste for painting, and each house became a picture, just as the artistic sense developed within the man. And it was wonderful to see how the strength and speed of a great engine was brought out by the colour tones of the different parts. The massive strength of the larger machines was made more impressive by choice of colours and deft application.

One old man, who for years had delighted in seeing the deep green of the morning glories mounting ever higher on the sunny side of his fan house, which itself was always a model of order and cleanliness, was delighted when the news came out that henceforth the company would be pleased to give flowers and plants and shrubs to all workmen who decided to beautify their surroundings. His eyes shone with new lustre in appreciation of the one in authority with tastes similar to his own and with a desire to develop them who had come, and he welcomed the coming of this kindred spirit. Potted plants began to fill the windows inside, and soon the fan house was fragrant with the perfumed breath of flowers in bloom. In keeping with the flowers, was a spotless floor, an engine clean and shining, cared for by a man whose work had grown lighter because of pleasant surroundings.

But all this time the mechanical superintendent who had been moving in and out inspecting the machinery and building was under the spell of the inflowing aesthetic tide. The spirit of Chloris and Flora, the Goddesses of flowers, had been brooding over and within him, and found in him an artist of exquisite tastes. He at once set himself to improve the work of his fan man. The space around the fan house was enlarged and laid out as a garden with white gravel walks winding in and out among the beautiful flower beds and grass plots. To protect these, there was built an artistic fence made of strands of worn out wire rope, elaborately wrought and beautifully painted, while what looked to be a richly carved turn stile but what in reality was only an ingenious combination of old boring augers from the mine, was placed at the entrance to this most attractive colliery garden. The fan house itself was given a fresh coat of whitewash while that part of the fan which stood outside was painted black. This black ground added to the green of the grass and the artistic design of the plot with its triangular beds and beautiful flowers now makes a most pleasing picture. This year a miniature lawn with the name and number of the colliery wrought in round white beach rocks has been added together with other improvements in the appearances of adjoining buildings. This colliery No. 10 was award

ed the first prize in the New Waterford District, last year. What it may do this year remains to be seen, as other neighbouring collieries are closely following in its wake.

Flower Garden Replaces Clinker Dump

Another mechanical Superintendent with an innate love of the beautiful saw an opportunity in the new degree for gratifying his taste, and began to look round for a place for a garden. The only suitable place was taken up by a pile of clinkers from the fire doors. The pile was removed and new soil filled in, flower beds were laid out and flowers planted; and being in a spot sheltered from the winds but accessible to sunshine, very soon a profusion of variegated flowers gladdened the eyes of men and the hearts of numerous little honey-bees. The splendour of this garden last year was far beyond any of those at the other collieries. The garden was enlarged this spring and the gravel walks re-arranged with excellent taste. The beds have been raised and re-shaped with the skill of a first class landscape gardener, and the whole presents a scene that compels passers-by to stop awhile and feast their eyes. Thus we have beauty, if not from ashes, then from the place of a former ash-pile, and a scene of loveliness where heaps of red clinkers rendered the earth barren and ugly, wounding the senses and paining the eyes.

It was this colliery with its well-graded mine yards, the neat and clean appearance of its buildings splendidly arranged, and its beautiful garden, that drew forth most favourable comments from the financiers of New York and the experts of Bethelem Steel, who lately made a visit of inspection to the property of the Empire Steel Corporation, and who expressed themselves as highly satisfied with the appearances and the condition of all the collieries.

General Manager Merrill, who never misses an opportunity to encourage his under-officers, passed on this compliment in a graceful letter to his superintendents, and through them to the mine managers, at the same time urging all to continue their efforts towards further attainment along this line. Whether we look on this as an expression of Manager Merrill's own highly cultured tastes, or an act of commercial wisdom, or both, it inspires and stimulates both officials and workmen to have kind things said when they are deserved.

Beautifying the Interiors

But the realm of nature outside with all its loveliness and its flowers arrayed in a glory greater than Solomon's was not to be permitted to go unchallanged. Indeed one or two of the stationary engineers had long before been enchancing their surroundings and beautifying their engines with paint according to their tastes. They therefore had a long handicap over their amateur brothers.

One man of gray hair who had seen long service at sea, still carried the marine atmosphere and discipline with him. On entering the engine house of which he had charge, one was struck with its resemblance to the engine room of a great ocean liner. Everything was bright and shining with paint and the place was immaculately clean. Even the wrenches were painted in different colours and hung up in such a manner as to lend beauty and harmony to the whole. One could not help feeling that here was a man deeply interested in his work, and in so far as he could, he lavished his best upon it, and one left the building with a warm feeling for one whose work was ready for the inspection of the Captain at all times.

Another is a workman, still young in years, whose building one now enters with a feeling of profound respect—so much so, that one feels like taking off hat and shoes, the hat to the man and the shoes to the floor of the building. It is a large, spacious engine house. The floor is of concrete, finished with concrete polish, and shining like a mirror. To protect it and keep it clean, long strips of rubber matting run all round, while everything within is "wondrous neat and clean." The engine has been well set up,—no vibration, noisless action, and nothing to detract from the influence of a beautiful and well-lighted building. Close by the handles stands a quiet, neatly-dressed workman. The building inside reflects his mind. It is a picture, a work of art created by him. He is by nature a painter first, an engineer second.

Who has not entered a beautiful building and felt its soft, soothing influence stealing gently over his spirit? Here was moral uplift. And what Briton ever stood on Trafalgar Square, London, under the shadow of that slender monolith,—Nelson's monument pointing skywards, surrounded by the four great stone lions guarding the corners of the square,—without being impressed with Britain's strength and Britain's courage? The whole scene grips the imagination and figures of great men of the past and present pass in panoramic vision before the mind. These are great works of art, powerful both in presentation and re-presentation.

And so, only in a less degree, with this spacious engine room, representing as it does the industrial side of life with its powerful engines pulling great loads from earth's depths, its sweet, wholesome atmosphere, its flood of light and sunshine, its mirrored floors,—the two prime elements of all works of art whether they be graphic, plastic or literary. It has impression and expression. The imagination is awakened, and while fancy's flight may not wing its way to "spacious firmaments, fretted with golden fire," or St. Paul's Cathedral, or the Nelson monument, the expression of the building is of things peaceful, pure and good. Surely, this one building alone has been worth the whole effort.

Even the Fields Improved

But improvement has been extended beyond the colliery yards and mine buildings. Around many of the collieries were fields of stumps, menacing the safety of property and giving the impression that the love of the beautiful had in these parts been long since dead. These fields were cleaned and seeded down to hay, which, besides adding to appearances, provided a new source of revenue. But a grass sward has an added value round a coal mine, especially where pillars have been drawn too close to the surface. In times of heavy rain much water is shed and run off before it has time to soak through the sod and find its way into the mine. From an economic view-point, this improvement has been sound.

But I do not wish to convey the impression that all the Dominion Colliery Buildings are King's Palaces, and all workmen have risen to the occasion and developed into great artists. There is yet room for improvement. Changes must and will be made, and when times are more favourable the finishing touches will be put to the buildings and yards of the surface plants at these collieries. Meanwhile improvement continues and the best is being made of what must remain permanently on the landscape.

According to the Annual Report of the South Australian Department of Mines, the total yield of gold during 1921 was 2,628 ounces; silver 1,449 ounces; copper, 30,640 cwt.; iron ore, 506,993 tons; manganese ore, 1,596 tons; barite 1,269 tons; gypsum, 34,383 tons; phosphate rock, 5,079 tons, and salt, 56,492 tons.

British Columbia Letter

Anyox

Bush fires have swept over a large area of this district, and, though fortunately they have caused no actual damage, they have caused a good deal of alarm, as at one time they enveloped the Granby company's powder magazine and threatened damage to the railway track. It was feared, too, that they might destroy some of the lumber for the new dam. Work on the new dam is being pushed along rapidly, and at the present time everything points to increased power being available before the end of the year. This will mean much to the Granby company, as it is estimated that between $150,000 and $200,000 will be saved annually in fuel oil alone. There is a rumor, too, that with a large supply of electricity available the electrolytic refining of blister copper may be undertaken at Anyox, instead of at the Nichols Copper Company's plant in New York state, as has been the custom in the past.

Nickel Plate Gold Mine

The Hedley Gold Mining Company's mill, which has been idle since September, 1920, has been re-started, and at the present time is crushing about 200 tons of ore daily. The Nickel Plate mine, from which the Hedley company derives its ore, has in the past been one of the best gold producers in the Province. The ore body is some 35 feet wide and runs in the vicinity of nine dollars in gold per ton. With a view to producing as much gold as possible during the war, work was concentrated on production, and development was neglected to a considerable extent. The result was that it was found to be impossible to catch up with the dead work when hostilities ceased, as was intended, owing to the high cost of labor and supplies. Consequently the mine was closed down in September, 1920, and has remained closed until the spring of the present year. A considerable amount has had to be expended in repairs to flumes and power plant after the long period of idleness, but now that the mill has been put into operation once again, it is hoped and expected that the mine will be worked for several years, as it gives employment to about 60 men, and in the past has provided about one-fifth of the gold output of the Province and from twenty to thirty thousand dollars worth of arsenic each year.

Prospects near New Hazelton

Dalby B. Morkill has made an examination of the Silver Queen group, at Owen's Lake, and of several properties on *Rocher de Boule* mountain for United States interests. There is a good deal of prospecting being done in this neighborhood, especially on Hudson's Bay mountain, where some very promising discoveries are being opened up.

Portland Canal District

C. A. Banks, consulting engineer for the British Columbia Silver Mines, Ltd., has returned from London, where he has made arrangements with the London shareholders of the company for an active campaign of development during the present season. The British Columbia Silver Mines property adjoins the Premier mine property on the north, and, it will be remembered, the Premier Gold Mining Company bought one third of the stock of the company last fall. The remaining two-thirds is owned by the Selukwe Gold Mining Co., which is operating in the Rand fields of South Africa. It is not known what arrangement exists between the two companies that hold the stock in British Columbia Silver Mines, but if it is an amicable one, there is little doubt but that the Premier company can give some valuable hints, obtained from the development of its own property, as to the best method of developing the one to the north of it.

The Indian Mines, Ltd., is driving a tunnel to develop at depth a strong lode of ore that has been exposed at several points on the surface. The lode is 10 to 16 feet wide and is heavily mineralized with galena for two to six feet on the hanging wall side. The ore carries gold and silver values across its whole width. Two shifts are being worked in the tunnel and another shift is working on the trail, which is in bad repair. The work is being done under the superintendence of Roy Clothier.

O. McFadden has located a wide belt of ore on the Dwyer group, at the north fork of the Marmot River. The belt is 80 to 100 feet wide and has been traced for some distance on the surface.

The Premier Gold Mining Company has made its first shipment of bullion, the bullion plant for working up the cyanide precipitate recently having been completed. The shipment, which consisted of some 800 pounds of bullion, is the first bullion shipment that has been made from the Salmon River district. The Premier company is about to start work on a number of bungalows for its married employees.

George Clothier, district mining engineer, and George Young, district road superintendent, will make a reconnaissance survey for a trail to connect the Bear and Kitsault Valleys, and in this way make a trail from Stewart to Alice Arm. If such a trail can be constructed it is believed it will open up a very promissing new district, which at the present time is too inaccessible to tempt the prospector.

The town of Hyden, which is the United States gateway to the Salmon River district, evidently does not mean to allow Stewart to have all the trade of the district. The necessary appliances have been assembled, and a new wharf is to be commenced at once.

Development on a Skeena River Property

The Kitselas Mountain Copper Company held its annual meeting recently, when the retiring directors were re-elected. The general manager read his report of the year's operations which were considered to have been entirely satisfactory, and development will be pushed forward during the present year.

The Coal Strike

The Knowles Conciliation Board, appointed to investigate the dispute between the Western Canada Coal Operators' Association and the No. 18 District of the United Mine Workers of America, issued majority and minority reports. The documents are lengthy ones, dealing with intermittency of employment, and showing that from 126 to 197½ days' labor per year was all that the men worked, consequently a higher wage rate was necessary than would be the case if the men had a full year's work. Summarized, the majority report recommended a wage rate approximately 30 per cent. less than that in force for the two years prior to the cessation of work on March 31, last. The majority report was signed by W. E. Knowles, chairman of the board, and by E. Astlund, who represented the miners. The minority report suggested a reduction of between 37 and 40 per cent. of the wage rate in effect prior to March 31. It is not yet known how the reports will be received by the respective parties, but Jesse Gouge, vice-president of the Coal Operators' Association, on hearing the verdict of the Board, stated that the Alberta mines

would close within two or three weeks after opening if no greater reduction than that recommended by the majority report were made.

The reports, which affect the mines in southern Alberta and eastern British Columbia mines, will be considered by the operators and the miners during the present week. Under normal conditions the district employs about 12,000 men, but for some time prior to March 31, when the old agreement between operators and men expired, only about 7,000 men were employed. This is perhaps one of the best features of the present condition, as undoubtedly more men and more operators have been trying to make a living out of coal mining that the industry under existing conditions is able to support.

Chu Chua Coal to be Prospected

Glenville A. Collins, Engineers, Ltd., have taken a lease on 2,000 acres of coal lands at Chu Chua, near Kamloops. Mr. Collins stated that an extensive diamond drilling campaign would be started as soon as the necessary machinery could be got to the ground. Later a plant for the handling of 500 tons daily would be erected. This coal area caused an interesting dispute between some of the staff of the Geological Survey and property owners in the district at the last meeting of the local branch of the Canadian Institute of Mining and Metallurgy, a paper read by one of the staff of the Survey being unfavorable to the probability of finding coal in commercial quantities in the Chu Chua coal basin.

Power for Sullivan Mine

The East Kootenay Power Company has entered into a contract to supply the Consolidated Mining and Smelting Company with power to operate all the mining machinery at the Sullivan mine and all the power that will be required for the new concentrator, now under construction. The contract calls for the delivery of not less than 8,000 h.p. The Power Company already has an excellent plant developed on the Bull River, from which it supplies Cranbrook and Fernie, but in order to meet the increased requirements of the Consolidated company a new 20,000 h.p. plant will be developed on the Elk River, and work will be commenced on this plant immediately.

New Orebody in Boundary District

A large body of ore, well mineralized with chalcopyrite and carrying gold, has been struck at the Molly Gibson Burnt Basin Mining Company's property, at Paulson. The strike was made in the new shaft, at a depth of 75 feet, and the ore is right across the shaft, eight feet wide, and the hanging wall has not yet been reached. It is thought to be one of the most important finds that has been made in the district for some time.

Work has been started on the Enterprise group, adjoining the Molly Gibson. Ed. Terzick is superintending operations at both properties.

Results in Cariboo Placer Field

As practically everyone who knows anything about the Cariboo deposits expected, the large influx of an intelligent class of prospector into this district is bringing its reward. It is true, of course, that a good many men have "gone broke," but that, too, was to be expected. A large number came here, despite warnings to the effect that no work could be done before June, long before the snow had melted; they became discouraged and disgruntled, and some who had the necessary funds left the district before they had an opportunity to do any prospecting, and have gone away prepared to say everything that is bad about the place and the prospects for finding gold. On the other hand, a number of intelligent, hard-working prospectors have remained, and already the result of their work is being made manifest. A. Pierce, E. Gladwin, and J. Sacker, who left Quesnel six weeks ago for the Clearwater country, at the head of Quesnel Lake, returned recently, and report the discovery of really rich ground on Blue Lead Creek, at the head of Quesnel Lake. Pannings are said to show heavy gold in considerable quantities. Finds are reported from Keithley and Spanish Creeks, and, considering the earliness of the season, results that have been obtained are really most encouraging.

Messrs. Guest and Munsen, who are acting for Kelowna capitalists, and who recently purchased the Stevens and Sheridan claims, adjoining the discovery claim on Cedar Creek, have purchased four adjoining leases, the consideration paid being said to be close to $200,000. The Big Six, as the group is being called, are probably, so far as development has shown, about the best claims in the district.

R. D. Featherstonhaugh, who has been in the district for some time, left recently for Vancouver, where he will attempt to raise capital for financing the development of the group of leases in which he and his associates are interested. Mr. Featherstonhaugh considers that the properties can be operated successfully only on a large scale with expensive machinery.

Experiment in Placer Mining

A novel experiment in placer mining is being tried at the confluence of the Chilcotin and Fraser rivers. Early in the spring the water at this point was lower than it had been for many years, and some rich ground was found in the bed of the river which usually is covered by water. After the rivers rose so that the work could be no longer done, two gangs of men began mining operations in diving suits, and, it is said, are making some profitable clean-ups. There is some talk of attempting to alter the course of the river at this point, so that the ground may be worked on a large scale, as it is believed that a good stretch of rich ground is covered by water.

Drilling for Oil

The Atlas Petroleum Company has started to drill for oil on its property at Hall's Landing. The work is being watched with considerable interest, as natural gas has been escaping at this point for a number of years, and it is thought that even if oil is not found it is likely that a commercial flow of gas may be struck.

Find in Windermere.

A five-foot vein of almost clear galena has been uncovered on the Mineral King property, at Toby Creek. Assays run in the neighborhood of $200 per ton.

New Zinc Vein in Slocan

Lessees at the Whitewater mine, at Retallack, have struck what appears to be one of the most important zinc finds that has ever been found in the Slocan. The vein is seven feet wide, and assays 58 per cent of zinc.

Developments at Mayo

There is a general exodus from Dawson to the new silver-mining camp at Mayo. Not only are people going, (in fact most of them already have gone), but hotels, houses, and other buildings are being pulled down and transported to Mayo, where they are to be re-assembled.

Mayo is crowded, but there is plenty of work for everyone, and there would be work for more if there were any accomodation available. As it is, people are living in tents, in boats, and practically anywhere they can find temporary shelter. Many prospectors are in the hills, and work at the mines is developing large reserves of ore. The Yukon Gold Company and the Treadwell interests both have large reserves blocked out, and several smaller concerns have blocked out lesser amounts. Everyone speaks confidently of the future of the camp, the only thing lacking, apparently, being facilities for transporting ore to shipping points. Now that the future of the camp is assured, however, it is confidently expected that this will be provided, though by whom no one seems prepared to say.

Northern Ontario Letter

Mining Association Meeting

This week at Porcupine was marked by the holding of the annual meeting of the Ontario Mining Association at Timmins. The meeting was extremely successful, and resulted in bringing together a majority of the representatives of the operating mines in Ontario.

Balmer Neilly, secretary of the Association, presented an address which dealt with the benefit of the mining industry to every citizen of Canada. The views presented were such as should go a long way toward attracting the attention of agriculturists as well as business men in the older part of Ontario.

Rochester Property Changes Hands

Another big mining deal was closed this week in the Porcupine district when the Rochester property was taken over by the Canadian Gold Mines Company, made up of British and American financiers.

The purchase of this property involves a total of $275,000, the terms being $10,000 cash and substantial cash payments due at intervals of every three months until paid in full.

Coming so quickly on the heels of the deal whereby the Hollinger secured the Schumacher, this latest deal attracts added attention and goes to show the growing interest in properties lying adjacent to the big producers. The Rochester lies next to the Hollinger, on the north.

Mr. Theodore Gross, of New York, is one of the principal American financiers, while Mr. Sara, of Montreal, is identified with the British interests involved.

Gold Production in June

Production of gold from the Porcupine and Kirkland Lake districts was well maintained during the month of June. According to preliminary estimates, approximately 171,500 tons of ore were treated, as compared with 172,000 tons in the month preceding. At each of the mines the grade of ore varied only slightly from the preceding month and resulted in an estimated production of approximately $1,745,600 for the month. This compares with estimates of $1,755,000 in May.

At this rate of production, the aggregate output of gold from Northern Ontario for the current calendar year will approximate $21,000,000, or an increase of more than 25 p.c. over any previous record in the history of mining in Ontario.

Although these figures are imposing, yet the future outlook is still better in the knowledge that additional milling equipment has just gone into operation on the McIntyre Porcupine, while on the Hollinger another increase is pending.

The barometer indicates a steady rise in gold production from Northern Ontario over a further period of years, and the areas now under development may reasonably be counted upon to yield an average of $25,000,000 a year over a long period.

High efficiency on the part of the workmen is resulting in approximately 50 tons of ore being handled monthly by each man on the pay-roll at the producing mines.

Hollinger's Half yearly Output

During the first half of 1922 the Hollinger Consolidated enjoyed an income that is unofficially estimated at $5,700,000, the mill having handled an average of close to 4,000 tons every twenty four hours, or a total of around 700,000 for the six months. This would indicate a recovery of upwards of $8 from each ton of ore treated.

Allowing $5 to cover costs and depreciation, and taking $3 as representing the net profit on each ton of ore treated, the net return would approximate $2,100,000 or at the rate of $4,200,000 a year.

An appreciation of current achievements at the Hollinger requires the recollection that the company is capitalized at $25,000,000, made up of 5,000,000 shares of the par value of $5 each. The annual gross production is equal to between 45 and 50 p.c. of the capitalization of the company, and the net profit is equal to approximately 17 p.c. of the issued capital.

Elbow Lake

Evidently the Elbow Lake district of Northern Manitoba is to experience disappointments — in this respect being like the Porcupine and Kirkland Lake districts in Northern Ontario in their early days. Already the cat of rumor is close to the ground and is picking up "sound waves" which may spell a set back for the enthusiasts who had commenced to believe that the gold mining industry of Northern Manitoba was to be swept into world prominence on the crest of one great wave of progress.

The development of mines is usually a long and difficult task. The road from raw mineral lands to mining fields of importance is strewn with disappointments as well as gold.

Set backs have never delayed for long the development of new mining fields once important discoveries have been made. Pioneers in Northern Manitoba will do well to remember the "slump" into which Cobalt fell soon after the first boom. They would also do well to keep in mind that soon after the big discoveries of gold in the Porcupine field it became known that M. J. O'Brien had surrendered his option on the Hollinger group of claims and with that many deals that had been pending fell through.

If disappointments fall in the pathway of the present wave of interest in Northern Manitoba, this will not mean that ultimate success may not follow. Northern Manitoba has been found to have surface deposits that compare well with other mining fields, and with favorable geological conditions existing, it is reasonable to believe that the province will sooner or later contribute in an important way to the mineral production of the Dominion.

Mining Plant for Hattie Prospect

A new mining plant has been purchased for the Hattie Gold Mines and will be installed as quickly as possible. The new equipment consists of a four drill Ingersoll Rand air compressor driven by semi diesel oil engine, air hoist and so on, the entire order to be delivered within four weeks. The purchase was made from the Canadian Ingersoll Rand, Cobalt, and the equipment is of the most modern design.

The installation of this machinery on the Hattie Gold Mines will expedite the exploration and development of this promising property.

A Ton of Silver a Day

The mines of the Cobalt district are producing approximately one ton of silver bullion every twenty four hours. This high rate of output is tangible refutation of the pessimistic views so often heard in the past year or so that the silver mining industry of Cobalt was nearing its end.

For more than a decade and a half, there has not been one single twenty four-hour period go by, but that the mines of this field have produced at least one ton of silver bullion and as much as three tons were produced daily in the banner days of the camp.

"A camp that can produce over one ton of silver bullion every twenty four hours is a long way from being dead", is a remark which was made to the representative of the Journal, by Arthur A. Cole, mining engineer for the T. & N. O. Railway.

Disputed Mining Claims

Very few mining disputes for comparatively raw mining claims have aroused more interest among prospectors than that in which C. E. Pinelle is involved, in connection with mining claims in Lebel township. The case was supposed to have been heard before Mining Commissioner Godson, K.C., several weeks ago, but was postponed. The technical points involved have a direct bearing on many claims held by men who served overseas, while the outcome of the dispute will decide whether the deal for the Moffatt Hall Gold Mines will go through or not.

Dominion Reduction Plant Resuming Operations

The Dominion Reduction plant resumes operation this week, and will gradually be brought up to full capacity. Sand tailings from Peterson Lake will be handled at the rate of approximately 350 tons daily or about, 10,000 tons a month.

The silver content of these tailings is low, but by reason of handling a large tonnage it is believed that a substantial margin of net profit will be realized. A recovery of from four to five ounces of silver from each ton would result in a production of between 40,000 and 50,000 ounces monthly, or a total of between 200,000 and 250,000 ounces of silver before being forced to temporarily suspend operations with the arrival of winter.

In the meantime, no mining operations will be attempted in the Peterson Lake mine itself, although officials of the company are confident that given the necessary finances and favorable conditions an aggressive exploration and development program might reasonably open up important deposits of ore.

Veterans' Mining Claims

By reason of the representations made by the local branch of the G. W. V. A., the promise of Hon. H. Mills, Minister of Mines for Ontario, to protect the mining claims of returned soldiers has taken concrete shape in the form of the following copy of an Order-in-Council which has been posted up in all mining recording offices in the province:—

"The Committee of the Council have had under consideration the report of the Minister of Mines, dated June 17 where he states that with the object of assisting returned veterans of the late war to retain possession of their mining claims endangered through their inability to perform the working conditions thereon within the time prescribed by the Mining Act of Ontario, or Order of the Mining Commissioner, the Minister recommends that under and by the said authority of the said Act, it shall in the case of a mining claim or of an interest therein acquired before enlisting or enrolling by anyone who enlisted or enrolled for active service against the King's enemies in the said war, be deemed to be a full compliance of the said working conditions of Mining Commissioners Order, if the first instalment of work, whether the first thirty days or any subsequent instalment, as the case may be, falling to be performed on or before the first day of July, 1922, be duly performed on or before the first of August, or on or before any extension of time expiring subsequently to said day; and if on such instalment of work being duly performed and recorded, the remainder of the work being performed at the rate per annum prescribed in the Mining Act, but so that it shall not be necessary for more than forty days' work to be done in any one year, save only in such cases, if any, where fifty days' work are required to complete the full 200 days, the date for performing such work to be computed from the said first day of August or from the expiry of any extension of time expiring subsequently to that date. In computing the time within which the work for any such claim or interest therein is required to be performed, all time necessary to give effect to this recommendation shall be excluded.

"The foregoing not to apply to any case now in dispute or pending before the Mining Commissioner or Mining Recorder."

Development of Alpine Prospect, Gowganda

Work on the Alpine Silver Mines at Gowganda is being carried on with encouraging results. Operations have centred in the diabase sill, and no attention is being given to the Keewatin contacts on either the upper or the lower side of the sill. It is understood that some attention will shortly be paid to the Keewatin in close proximity to the diabase contact as this is generally considered by geologists and successful miners in the Cobalt field to be more attractive territory than in the diabase itself.

Indian Chutes Power Plant

By the end of the current year, from the extent of the progress so far made, the hydro-electric power now in course of development at Indian Chutes on the Montreal River will probably be ready for use at Fort Matachewan. A force of between 70 and 80 men are now employed, and it is expected to generate 2,000 h. p. from the equipment now being installed.

Completion of this installtaion, it is stated, will signalize a reopening of the Canadian Matachewan Mine, formerly the Fort Matachewan Gold Mines. This property was developed previously to a considerable extent and is known to have a substantial tonnage of ore that contains about $11 in gold per ton. Given electric power and reasonable transportation, such ore would yield satisfactory profits. This work offers promise of encouraging quite general activity in the Fort Matachewan field as well as that area lying to the east, in the direction of Kirkland Lake.

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EDITORIAL

By the rate we develop our natural resources, especially those of coal and iron, shall our industrial progress and our standing among the nations be measured.—A. E. Barlow, 1914.

A NATIONAL IRON AND STEEL INDUSTRY FOR SOUTH AFRICA

South Africa has decided, through her elected representatives, that she must have the iron and steel industry upon which the industrial system of any modern nation is mainly built. A cabled despatch announces that a bounty on pig-iron and a further bounty on steel has been proposed by the Government. It is asserted that what is at present lacking for the building up of a well founded steel industry is capital alone, and it is calculated that the bounty, unusually substantial at first, and diminishing to zero at the end of eight years, will be sufficient inducement for large capital expenditure. Coal, iron ore, and fluxes are available in abundance, and railway facilities are, in the main, already provided.

On another page, we review the report on South Africa's iron ore resources recently published by the Imperial Mineral Resources Bureau. This is one of a series of volumes that will describe, in a comprehensive way, the iron ore resources of the Empire and of the world. That these volumes will contain the best information obtainable, and will supersede the compendious volume on iron ore compiled in 1910 by the International Geological Congress, is evidenced by the fact that the Imperial Mineral Resources Bureau is composed of a representative gathering of the Empire's leading mineral technologists, among them our own Dr. W. G. Miller.

The domestic requirement of iron and steel products in South Africa is comparatively small. There is no doubt that the production of these materials in the interior of the African continent will expedite its development quite materially and so will help to expand the home market. But it is upon an export market that South Africa's immediate hope for an iron and steel industry commensurate with her extraordinarily favourable conjunction of resources in iron ore and coal, must depend. As the future centre of steel production is some hundreds of miles inland, it is considered that only the more valuable finished or semi-finished steel and iron products will find ready sale in the world's markets.

It is not impossible that there will be, in the future, a repetition in South Africa of the condition that has made the iron ore industry of the Lake Superior region of the United States unique. The Lake Superior ores have an exclusive market throughout the interior of the North American continent, at present based not so much upon any superior quality as upon the natural barriers that exclude competitors. Coal of the right quality and in sufficient quantity is available south of the Lakes, and as a result of the settlement of the continent and the liberal use of iron and steel products by its inhabitants, the iron and steel industry of the Great Lakes region has become the largest in the world. Little of its product reaches the Atlantic or Pacific markets, but it supplies the requirements of the larger part of the continent's hundred odd million inhabitants.

South Africa's may be a similar case, and may in time not only provide the iron and steel used in a large part of the continent, but may constitute the centre of industrial activity, which will in turn provide a ready market for agricultural products, and so stimulate a settlement of the vast vacant spaces of the southern part of that continent that now invite the white man's attention.

South Africa's present case is analogous to that in which Canada found herself twenty years ago—but quite different from Canada's case today. At the opening of the century, it seemed certain that the bonus provided for the production of iron and steel in Canada would result in what the South Africans hope for today through the same means. But the two cases differ in the fact that, whereas Canadian calculations were based upon the hope of discovering adequate deposits of iron ore, the South African ore for the purpose is already in sight, in addition to adequate coal reserves.

In this connection it is interesting to note that the Hon. F. S. Malan is South Africa's Minister of *Mines and Industries*—a conjunction of duties that is obviously appropriate, though our Canadian legislators are quite oblivious to its significance. The creation of this combined ministry and the hearty support accorded the Iron and Steel Industry Encouragement Bill by General Smuts are well worthy of that truly great leader and Imperialist.

SOLIDARITY OF THE MINING PROFESSION

The miner, from prospector to operator, is inclined to be an individualist. That is good for the profession, as mining, like farming, depends so completely upon individual enterprise and initiative for its progress and continued existence. But in this case, as is usual, one can have too much of a good thing. Co-operation has a more important part to play in the development and operation of mines than most of us realize as yet. That some of the leading spirits among us realize the need is shown by the

recent highly successful meetings in Nelson, British Columbia, and Porcupine, Ontario.

The mining convention at Nelson is notable as an international meeting. It is the annual occasion on which the men concerned with the business of mining in British Columbia gather to review progress, discuss present conditions, and lay plans for the future. The meeting is always made the occasion of pronouncements by men in charge of public departments, and frequently the issuance of these is of prime importance. Investors, engineers and public administrators, all interested in the same broad objective, make common cause, with notable results.

It is natural and logical that the Nelson convention should include such a prominent representation of citizens of the United States. As pointed out by the Lieutenant-Governor of British Columbia, it was due principally to the initiative of American citizens that the mining industry of the province was inaugurated, and its continued progress is still dependent to a large extent upon the investment and energy of the same friendly foreigners. Such international relations as are demonstrated annually at Nelson are among those facts that cause Canadian-American amity to be an example for all the world.

The Ontario Mining Association is more exclusive in its personnel than the Nelson meeting, as it includes only the owners and operators of mines. This restriction necessarily limits the sphere of its activities, and makes the Association less representative of the mining industry of the province. Still it leaves plenty of scope for useful activity, especially in the way of keeping the mine operators of the province alive to the need of action in concert along certain lines that are essential to the progress of the mining industry.

An achievement during the past year that can be credited to the Ontario Mining Association is the express exclusion of mining engineers from the operation of the Professional Engineers Act. Our brother-engineers in other lines would have us join with them in making engineering a closed profession; but the majority of our mining engineers, though fully qualified to enter such a corporation, have a distrust of such a legalized union that prevents their participation. That this is not confined to Ontario is evident from recent action in British Columbia, where a movement is on foot to effect a belated exclusion of mining engineers from the operation of the Act recently put in effect in that province.

All these questions affect the main issue, which is the solidarity of the mining profession. The arguments for and against conventions, associations, and legal enactments bearing on the mining industry must be examined in the light of their effect on the industry as a whole. Aid to selfish or sectional interests is more than likely to impede progress in the long run. As these activities forward the legitimate objects of the industry they are good; where they run counter to the sound interests of the community, they must be opposed. The only mutable part of the industry is the fallible human beings engaged in it. Hence, upon the good judgment of the leading spirits of the industry depends, not only its solidarity, but its relation to the national community. We are confident that the spirit expressed and engendered by the conventions at Nelson and Porcupine will aid in directing the energies of Canadian mining men and the thought of the Canadian public along the right channels.

MARKETING MINERAL CLAIMS

As we have pointed out frequently, the progress of the mineral industry depends principally on the prospector. If he quits work, the whole industry will stop with the gradual exhaustion of known mineral deposits. So it is worth while to consider all means by which the work of the prospector may be made more systematic and less liable to discouragement and failure.

The examining engineer is an important factor. When a claim has been staked, the owner is naturally anxious to realize something on it as soon as possible. His discovery may have come at the end of a long period of outlay with no return. Either from pardonable haste or through ignorance, he may invite the attention of investors before the property is prepared for examination by stripping, trenching and test-pitting. When the engineer looks over a claim in this condition it is quite natural for him to feel a bit disgruntled, particularly if he has had a long, hard journey to get to it. And it is not uncommon for engineers in such cases to say something discouraging and perhaps unduly final, although there has been really no chance to examine the merits of the property.

What is the prospector to do next? Too often he does not know, and often he does nothing. His claim is like a child of his. He has faith in it, but he does not quite know what to do with it. A little wise counsel at such a crisis is what is needed, and the engineer is in a position to give such advice. It would greatly facilitate the proving of claims if all examining engineers would make it a point to indicate to prospectors in such cases what is necessary in order to put their claims in shape for examination. We know mining engineers who do this as a matter of course, and our Canadian field geologists, both provincial and Dominion, are very helpful to prospectors in this way. There are cases known where a simple hint founded on geological and mining experience has led to very important extensions of the discovery. This kind of work could be greatly extended without seriously interfering with the proper work of the geologist and the mining engineer. In fact, it perhaps should be considered part of their proper work.

It will be noted that in this discussion we have in our mind's eye the real prospector, who most usually grubstakes himself. A good many of our best prospectors belong to this class, preferring to work independently and to reap the full benefit of their discoveries. They have the self-confidence of the man that has learned to

take care of himself under all circumstances in the bush, but they also have a growing respect for the knowledge and judgment of the geologist and the mining engineer. But many of them have learned to look with suspicion on the examining engineer, and they say they prefer to take their chances with the promoter and stock-broker rather than run the risk of having their properties coldly condemned after a cursory examination. We have heard some of them even profanely eloquent over the way in which an engineer had come to look over their claims, only to complain that they could see nothing but a crack in the rocks. Doubtless in these cases that was all that could be seen, but even a crack in the rock is in some situations worth careful following up. A word to that effect, with some indication of the best direction in which to work and a suggestion of another examination later on if further exploration uncovered something more promising, would be more encouraging than a simple condemnation of the property. Our plea is for sympathetic co operation between the prospector and the examining engineer.

EDITORIAL NOTES

Mr. Scott Turner, speaking for the Mining Corporation of Canada, wishes it to be known that this company has not now, and never has had, any interest whatever in the Elbow Lake district of Northern Manitoba. The company's only holding in Northern Manitoba is in the vicinity of Flin Flon Lake, 40 miles west of Elbow Lake. The *Journal* regrets having erroneously included the Mining Corporation among those interested in Elbow Lake prospects.

A reader of the *Journal* in Toronto, who is a shareholder in the V. N. T. mine at Porcupine, Ontario, has written protesting the action recommended by the board of directors, and described by our Northern Ontario Correspondent today. If all the things this shareholder says about his board of directors, Mr. Arthur E. Moysey, Mr. Hamilton Wills and the Standard Stock Exchange are true, it is a case, as he suggests, for prompt official action, with an ultimate eye on an institution of correction on the outskirts of Kingston. There is no doubt that there is some justification for this "kicking" of minority shareholders, and we hope that there may be some prompt legal action to prevent what threatens to be a travesty of justice.

In the Toronto *Financial Post* of June 30th, there is published one of those judicial pronouncements on mining that are so rare in the public or financial press. An article by Austin R. Campbell sets forth, clearly and fairly, the fact that mining and prospecting are properly the business of trained miners and prospectors, and that in their hands the finding and developing of mines is no more hazardous a business than farming, and that it is the dabblers in mining that provide most of the failures. The same might be said of investors in mining, has been aptly pointed out lately by Mr. Alexander Gray. Intelligent investment in mining development or operation is sound and more than ordinarily remunerative in a country like Canada, whose mineral deposits are being found and put to use so rapidly.

Last autumn Mr. Ellis Thomson of Toronto University examined the Goudreau gold area on behalf of the Geological Survey, Ottawa, and an abstract of his report was printed in these pages on May 19th. Mr. Thomson is again in the field at Goudreau, and through the courtesy of the Director of the Geological Survey we are able to give today an account of present conditions in the new gold camp. Many are following with interest the events northeast of Lake Superior, which makes this account, fresh from the field, unusually timely.

Mining problems that would in other regions more favoured by nature cause the abandonment of a coal mine, stimulate the Nova Scotian engineer to renewed endeavour. The attempt to overcome "bumping" described in Mr. Nicholson's paper which we print today, is such an effort. Mr. Nicholson is one of the younger generation of engineers in Nova Scotia, and has brought energy and a vital faith to bear on his work, in addition to a well rounded experience. The recurrence of a local "bump" week before last does not necessarily indicate that Mr. Nicholson's new method of mining is unsuccessful. If as seems probable, he has solved his problem, he will deserve the thanks not only of his employers but of Nova Scotians and Canadians in general.

WELSH RABBIT

These here French cheffs I've heard about a lot,
How they can put cheese parings in a pot
And make it into a rabbit stew—My God!
I ett it wonst! Me and my pardner Rod
Got sort a soused and blowed into a place
Where none of us would, sober, show his face
The waiter ast us what we wanted first
And Rod, he looked at that there card and cursed
Sez he, sez Rod, "Say, pardner, this here rabbit
Sounds kinda good; you go outside and grab it
It wasn't what the both of us should need,
But there was nothin' else that Rod could read
The waiter fetched it after quite a spell,
And it was hot—say—it was hotter'n Hell
Rod ett his share and I got outside mine
And then the both of us just started dyin'
The way that our insides begun to burn
I knowed that rabbit's ticket was "return"

ANON

Recent Development in Goudreau District, Ontario*

By ELLIS THOMSON

During the past winter and spring considerable development work has been done on the property of the Goudreau Gold Mines, Ltd., in the vicinity of Murphy lake, Township 28, Range, 27, Michipicoten district. Comfortable log cabins have been erected and power has been brought in from Magpie Mine, which is about seven or eight miles to the west. Two double compartment shafts, some five hundred feet apart, have been sunk on the vein.

No. 1 shaft, which is close to Murphy lake, has been sunk to a depth of 136 feet, following the dip of the vein towards the south west at an angle of 65-70 deg. for the first 65 feet and 79-85 deg. for the remainder of the distance. At the foot of this shaft the vein is split up into a stock work or vein system, that extends across the width of the shaft. Most of the individual veins are small, although one near the hanging-wall side is 1-2 foot wide and carries the best gold values. The gangue in these small veins is chiefly quartz, though considerable carbonate is also present. The metalliferous minerals found at the foot of this shaft are for the most part the same as on the surface, with native gold, chalcopyrite, and pyrrhotite as the most prominent. In one part of the vein-system, near the 100 feet level, small amounts of niccolite and smaltite were encountered in a carbonate gangue.

Prospect Shaft on Murphy Claim.

No. 2 shaft has been sunk to a depth of 150 feet, vertically for the first 36 feet and at an angle of 64 deg. to the south west along the dip of the vein for the remaining distance. The gague is chiefly carbonate carrying cross-stringers of quartz and is said to carry good values although little or no gold is visible in hand-specimens. The metalliferous minerals chalcopyrite, pyrrhotite, and pyrite occur sparsely scattered through the gangue. At the bottom of this shaft the carbonate iron formation fills most of the fissure. It seems probable that the iron formation, which was deposited prior to the quartz, although appearing in places to be contemporaneous with it, acted as a good reducing agent for the formation of the metallics.

Mining Camp, Murphy Claim, Goudreau, Ontario.

Considerable development work has been done on the Bannville-Pagé claims north of Rowan lake, and native gold has been uncovered in two or three more places. The Webb claims on Godin lake have been taken over on a working option by the Algoma Development Co. and work has already commenced under the direction of Capt. Michael. The Cline claims east of Pine lake have also been optioned to a group of Montreal capitalists. In the last nine months a great many new claims have been staked in this district, and many of these as well as the older claims have been surveyed.

* Published by permission of the Director, Geological Survey, Ottawa.

British Columbia's Greatest Precious Metals Mine The Premier

By ALEXANDER GRAY

Without trumpetings, and with the thoroughness characteristic of men of the large mining affairs, the Premier property of the Portland Canal district of British Columbia has been brought to the producing and dividend stage. That the Premier Mine is the largest of its kind in the Pacific province is conceded. Practically a co-partnership the Company is one of these close corporations which do not court publicity however important the information would be for the benefit of the tributary country. "Good" being "as good as it looks", whatever of speculation entered into Premier company operations has been confined to the owners of three-fifths and two fifths respectively: the American Smelting and Refining Company, Isaac Untermeyer, Guggenheim Brothers, Miner C. Keith, on the one hand, and R. K. Neill, of Spokane, W. R. Wilson, Manager Crow's Nest Coal Company and President of the Canadian Institute of Mining and Metallurgy, R. W. Wood and A. M. Trites, merchants of Fernie, on the other hand. Under such auspices it was possible to devote years to preliminary determinations, development and equipment; and if there has been reticence, it has not been due to the absence of appreciation on the part of principals or of the best technical control, H. A. Guess, Vice-President of the American Smelting and Refining Company being the Managing Director of the Premier Company and Dale L. Pitt directly in charge of the management. Explaining the general attitude of the Premier Company and staff, Mr. Guess recently wrote:

> "The mine has been extensively developed, and equipped with water power and with semi-Diesel engines as power auxiliaries in winter months; also with a mill of 100 tons' daily capacity and an aerial tramway of 11½ miles from the lower tunnel and mill direct to dock at Stewart, B.C. A dividend of $400,000 was paid at the end of December, 1921, and $500,000 at the end of March, 1922, and if no particular publicity was given to either of these dividends, it was purely because there are only a few stockholders of the Premier, which is a Canadian corporation, and its shares are not publicly dealt in. First class shipping ore goes to the American Smelting and Refining Co., Tacoma smelter; second class shipping ore to Granby smelter, Anyox, B.C., and lower grade to mill. The management is lodged with the A. S. & R. Co., with myself as Vice President and Managing Director of the Premier. The Plant Manager is Dale L. Pitt."

That is brief and to the point. Money, management and a mine that was re-discovered by Mr. Neill, as the *Northwestern Mining Truth* puts it, have made the Premier, of Premier, one of Canada's show places. Mr. Guess is altogether too modest and too pre-occupied with multifarious business to go further into particulars. His interest in Canadian mining is long standing, and his familiarity with the Premier dates back to three years ago, when the property that was abandoned twice had been proved by Mr. Neill to possess exceptional merits.

The Premier as a Prospect

Off and on for a decade or more the ground underwent sporadic prospecting and exploration. "Pat" Daly's version of what happened when Bush, a champion skater, and Mr. Neill and his associates held it or had it under option, was given last summer in *The Canadian Mining Journal*. The Canadian Mining and Exploration Company had a pre-war try with Mr. Rolfe in charge. Then the Salmon-Bear River Mining Company, organized by Col. William Boyce Thompson of New York, spent about $80,000 under the management of H. R. Plate. It is understood both Messrs. Rolfe and Plate wished to continue the work. In the case of the Canadian Exploratoin company, however, the outbreak of war suggested the stoppage of work, and the Thompson interests quit later when a noted engineer en route from Kennecut could not see eye to eye with Mr. Plate. Had either party acted on the principle laid down by the disconsolate Swede, who swore he never would abandon another property "without going four feet further", the Premier property might never have fallen into the lap of Messrs. Neill, Wilson, Wood and Trites, to say nothing of the Guggenheim Untermeyer-Keith combination. Because of the earlier misadventures and current results, the fact that "only a few" are directly concerned, rather suggests that more data at frequent intervals placed before the larger audience, now there is a Premier post-office and continuous production. Of course the owners are satisfied. Their enterprise entitles them to the privilege of looking further. They have a real mine — and there may be others. Apart from Northern Ontario, no other section, unless it be Northern Manitoba, is undergoing such extensive exploration and development.

The Government of British Columbia are admirably aggressive in promoting the welfare of prospectors and those with speculative capital. Base metals there are in superabundance. It was the Premier Mine that spurred the province and mining capitalists to more aggressive efforts. The British Columbia Minister of Mines in his report for the year 1921 states that "the production of the Premier Gold Mining Company, Limited, of Stewart, of over $1,500,000 this year, is indicative of the output that is to be expected from that property in the future. The great increase in gold is due to the wonderful production of the Premier Gold Mining Company amounting to 40,101 ozs., against 2,283 ozs. last year. It will be noted that the total silver output was over 1,500,000 ozs., of which the Premier Company alone produced over 1,000,000 ozs." Having whetted the appetite for further details of the Premier, and sharing in the optimism of its modest owners, the British Columbia report momentarily supplies all sufficient data, showing the situation as it was at the end of 1921.

What has been Accomplished

"The company has this year accomplished a great deal in all the departments, mining, milling, engineering, equipment, and transportation, and the property has now reached the stage where there should be no more serious handicaps to interfere with maximum production. With the completion of the tramway from the mine to the beach the greatest difficulties have been overcome. Mining for the year consists of extensive development work about 1,000 feet on all three working levels. On the No. 1 level at 3,000

feet elevation, the south vein was located by diamond drilling, crossents run from the No. 1 tunnel, and the south stope opened up. It shows a length on this level of about 200 feet of the same lenticular character as the north vein, and with like enrichments along the fault seams. The greater portion of the ore shipped last winter and this summer, amounting to over 4,000 tons, was taken from below the No. 1 level on the north vein and above the No. 1 level on the south vein. On the No. 2 level, 1,750 feet elevation, a long crossent and drift picked up the south vein and the stope is now being opened up above this level.

"The south vein on this and No. 1 level is supplying all the ore to the concentrator, over 100 tons a day, and considerable shipping ore as well, found along the cross-slips. The No. 4 level, 1,325 feet elevation, has been driven ahead from the face of the old Plate tunnel, and at the time I was at the property (January 1st, 1922) had about 200 feet to go before it was expected to encounter the south vein. When this vein is opened up it will prove the ore-shoot to a depth of about 700 feet below the surface, and should the values hold as good as the upper levels will mean several millions of dollars worth of probable ore. When both veins are raised on from the No. 4 level and the ore blocked out and 'in sight', then a fair estimate can be made of the value of the ore. It has been reported in the press that there are $80,000,000 worth of ore in sight, which may prove true, but it is an absurd statement to make at the present stage of development.

"Diamond-drilling was being done on the No. 4 level, and one or two drills have been in operation all year, totalling 6,800 feet of drilling. A raise has been put through from the fourth to the second level and equipped with a hoist and cage for a thoroughfare from the No. 4 camp to the upper camp, where the main office is located."

Character of Ore-Bodies and Equipment

As this is the official view of Premier Mine developments, and the first to appear of official record, its continuous production removes all question as to the progress made. Of the ore bodies, Mr. Schofield has stated that they follow closely the contact between the quartz porphyry and the tuffs, both of which are highly altered. Several lenses occur in the quartz porphyry, but up to the present no ore has been located entirely in the tuffs. The shoots are in lenticular veins, the ore bodies are faulted and sheared and in most places are about 10 feet in thickness. To deal with the situation, an extensive plant and housing facilities have been provided. It was the problem of transportation that gave the management most concern. To meet the difficulty, the British Columbia Department of Mines describes what was done:

> "It was therefore decided to install a tramway and work was started this spring as soon as weather conditions would permit. The contract was let to the Riblet Tramway Company, Spokane, Washington, and that this company was able to complete it and have it in operation for January 1st, 1922, as a very creditable piece of work. It is 11½ miles in length, in four sections or with three angle stations, and with a tension tower on an average of about every 4,000 feet. The difference in elevation between the upper terminal at No. 4 level of the mine and the lower terminal at the dock is about 1,325 feet. The power required to operate it is a 50-horse power motor geared to the bull-wheel at the upper terminal. There are 8 towers in the entire distance. There are 120 buckets being used at present of 800 lb. capacity each. As it takes less than two hours for a bucket to travel the 11½ miles, it means a bucket dumped every two hours of about 12 tons, giving a capacity, at full speed, of about 12 tons per hour, which will be cut down somewhat when handling return freight.
>
> "The mill was started in July and has been running continuously, except for minor close-downs for repairs and alterations. On account of the complex nature of the mill-feed, especially its variations in silver-sulphide contents, its treatment has presented many complications and necessitated some small alterations in the mill from the original flow-sheet.
>
> "The mill was designed for treating 100 tons of feed in twenty-four hours, but has been running over capacity and producing from 20 to 30 tons of concentrates a day."

When it is understood the company has been using forty to sixty horses and two 5-ton caterpillar tractors for hauling, and handled during 1921 upwards of 6,000 tons of freight from the dock to the mine over the wagon-road, the achievements are too notable to withhold from the public. The shipments from the mine last year "amounted to 4,356 tons, from the concentrator 1,000 tons, and about 9,000 lb. of precipitates from the cyanide plant, the total production yielding 35,000 oz. gold and 1,200,000 oz. silver, valued at $1,200,000."

These figures do not tally with those given in the other portion of the British Columbia report, and already quoted. There is a seeming disparity of about 5,100 ozs. gold and 200,000 ozs. silver. However, on balance the Premier Company inaugurated its outputting on a greater scale by giving the proof of Portland Canal potentialities, —when the capital available is ample and the technical control all that Mr. Guess and his principals represent.

Mr. Neill Tells His Story

As the man who traversed the Western States and Mexico in quest of things with the ear-marks of mines, who was one of the Coeur des Alènes pioneers, has designed and built mills since 1886, who bonded the St. Eugène from James Cronin before it was sold to the Gooderham-Blackstock people, who was a party to the War Eagle, Rossland, deal with Finch, Campbell, Clark and others. Mr. Neill possessed versatility and vision. How many mining ventures he sponsored until he "made his pile", his romantically-strenuous career until then, need not be reviewed. Unfortunate investments in real estate, when he had foresworn mining, rather convinced him he had been recreant to what he was specially qualified for; so, after giving the "once over" to more country, he had his attention called to Portland Canal, which he visited. In 1916, therefore, having met Messrs. Trites and Wood, for whom he examined a property in the Cariboo, he suggested that they join him in a property offering possibilities at slight expense. This property was the Bush Mine.

How the Mine was Made

Beginning with March 7, 1917, when Mr. Neill took a bond from Bush, work began on April 7, Dan. Lindeberg being the foreman, who snowshoed his horses and packed in supplies. Five men were employed. Taking the situation as it had been left by Messrs. Rolfe and Plate, No. 1 tunnel was in about 80 feet from the portal and was in practically barren or very low-grade rock. As described in *The Canadian Mining Journal,* a crosscut was started from the tunnel working face. Two rounds brought the heading into a body of ore running $65 per ton in gold and silver. That was regarded as a fair start. Then attention was given to an abandoned crosscut. At a point 184 feet from the portal, this crossent had been run. "The first

round", says Mr. Neill, "opened up the ore-body, carrying around $60 per ton across 8 or 9 feet. So another crossent from the tunnel, that had been carried in 250 feet. At this point, with 175 feet of back, a shot or two again tapped the ore. The first 6 feet averaged $300 per ton, and the whole mass, 65 feet wide, averaged $55 per ton."

Needless to say, the section became more than interesting. Portland Canal lines of communication, though, were not conducive to large outputting. Work proceeded, but shipments were not made until the winter of 1917-18, when ore to the value of $75,000 was hauled on double-end bobsleds and rawhides, and shipped to Tacoma, which involved a freight and treatment charge of $18 per ton. The following summer, in 1918, the trail was widened and improved, and double bobsleds took out $200,000 worth of ore in the winter of 1918-19—enough to keep things going at a livelier pace. In the summer of 1919 a serviceable wagon road was completed. It reached the mine in October. By that time, it is related by Mr. Neill, "all improvements had been paid for out of profits, although the four original partners, Neill, Wilson, Trites and Wood, had each contributed $50,000 toward initial expenses and had borrowed an additional $60,000."

Their sporting bet, backed by Neill judgment, was making good so rapidly that other interests began to notice it. No doubt, Mr. Neill was not hiding his candle under a bushel. That was why two rival parties arrived on the spot about August, 1919. Mr. Guess dropped in on behalf of his principals, and Samuel L. Silverman, previously identified with the Keith-Untermeyer party, both of New York. Mr. Silverman "beat him to it". He was a lap ahead—just twenty-four hours. Mr. Guess made an examination. Of course they talked options, a probationary period for examination, reasonable payments. Mr. Neill had been there before. Neither options nor a purchase price was obtainable. Mr. Neill seemed somewhat impossible—the rivals were worse off than were Cecil Rhodes and J. B. Robinson when each eagerly sought to close the deal for the farm Langlaagte on the West Rand. Mr. Neill coyly remarked he would be just as happy "were t'other dear charmer away."

And both departed empty-handed. Shortly thereafter, Messrs. Neill, Trites, and Wood were invited to view the White Lights of New York, and they arrived there a month later. Promptly negotiations were resumed. As between the Guggenheim and Keith Untermeyer people, a compromise was effected, and terms acceptable to all partis were agreed on, on a basis of two fifths to the vendors and three fifths to the purchasers. What treasury shares were set aside, subsequently were distributed among the respective owners. Thus, it was that the Premier Company came into existence, this being the mining position at that moment:

No. 1 tunnel was in 250 ft. with backs of 175 ft.
No. 2 tunnel was in 200 ft., at a depth of 500 ft.
No. 3 tunnel was in 100 ft., at the depth of 650 ft.
No. 4 tunnel was in 570 ft., at a depth of 1,000 ft.

To-day, Mr. Neill has explained, "ore is coming from Nos. 1, 2 and 4 tunnels, although the latter is not yet in the main bonanza ore-body. The ore zone is over 100 feet wide, with the high grade anywhere from one to thirty feet wide. A combination concentrating, flotation, and cyanide mill, with a capacity of 150 tons, has been operating, power being supplied during most of the year by hydro electric plant, and by auxiliary Diesel engines during the dry seasons."

The plant is said to have cost around $300,000, according to *Northwest Mining Truth*, exclusive of the cost of the tramway, an additional $250,000. The mine is said to be now producing between 5,000 and 5,500 tons monthly, higher grade running from $75 to $350 to the ton, and shipped to Tacoma; lower grade, between $40 and $60, is going to the Granby, Hidden Creek metallurgical works. Mr. Neill vouches for it that the average of shipments has been around $100 per ton, with an average ratio of about 40 per cent. gold and 60 per cent. silver.

ONTARIO DEPARTMENT OF MINES REPORT ON SCHREIBER—DUCK LAKE AREA

There is now available at the Department of Mines, Toronto, Part IV of the Thirtieth Annual Report (1921). This contains three short reports. The second of these, by A. L. Parsons, contains a description of the minerals found in the ore of Silver Islet in Lake Superior, and demonstrates by means of micro-photographs the probable origin of the ore. The third is the report on the Gondreau gold area by A. G. Burrows, published in the *Canadian Mining Journal* in July of last year. The first report, on the Schreiber—Duck Lake Area, by P. E. Hopkins, is the one of more immediate interest. It is accompanied by a geological map of the area described, on a scale of a mile to an inch.

Though ores of zinc, lead and copper have been found within this area, it is the gold deposits that have awakened the most interest and that give most promise of economic importance,

In common with the rest of northwestern Ontario, the Schreiber area was scratched over by prospectors twenty years ago, and some ore deposits were found. Until recently the more promising of these have lain dormant, some attention having been paid to veins less worthy of it.

In the work of re-opening the deposits along the shore of Lake Superior Mr. Hopkins has been a pioneer. The fact that he re-located what is now known as the McKellar-Longworth property on Schreiber Point is somewhat obscure in his own account. This is commonly reckoned the most promising prospect in the neighborhood. Its development has been careful and consistent, as befits the work of a modern prospector such as W. L. Longworth.

The Jackson property, within a stone's throw of the railway, three miles east of Schreiber, contains some unusually rich ore; but the quantity, as described in Mr Hopkins' report, is hardly sufficient to make a mine. Exploration on both this and the Longworth properties is still proceeding.

There are gold occurrences for twenty miles along the margins of a batholithic mass of granite and syenite from Schreiber to Jackfish, and Mr. Hopkins suggests that these contact areas are worthy of careful prospecting.

At Big Duck Lake, fourteen miles north of Schreiber small amounts of rich gold ore have been found, but as yet no ore body of economic importance has been located.

After extensive experiments with the use of an Alberta coal for smithy purposes, the Industrial Research Department of the University of Alberta states that it compares very favorably with imported Pennsylvania coal for this purpose. Comparative tests were made under ordinary blacksmithy conditions, and included heating, welding and tool making. In all these tests the results obtained with the Alberta coal were equally as good, if not better than, those obtained with Pennsylvania coal.

Past and Present Methods of Mining, No 2 Mine, Springhill, Nova Scotia*

By J. C. NICHOLSON

No. 2 Mine of the Cumberland Railway and Coal Company at Springhill, N. S. is on the No. 2 seam, which is the lowest of the three principal seams in that district, the other two being respectively 100 ft. and 280 ft. above it. This slope was opened in 1871 and with the exception of several strikes — with which the people of this province are more or less familiar — has been in continuous operation since that time.

The slope is driven on the pitch of the seam which runs in a northerly direction. The average dip from the surface to the 3300 ft. level is 30 degrees with a maximum at one place of 38 degrees; from there to the bottom, which has now reached a total length of 6900 ft., it dips uniformly at 20 degrees. At 2800 ft. level a down-throw fault was encountered which necessitated driving a stone tunnel for 100 ft. This is the point of maximum grade.

The coal, which has an average thickness of 9 ft., is of excellent quality and has the reputation of being the best steam and domestic coal in Nova Scotia. The output at the present time is 1500 tons per day.

The mine is entered by three slopes — haulage slope, downcast air slope and pipe slope. At approximately 600 ft. intervals levels are broken off which are designated by their distance from the surface measured along the slope, such as: the 1300 ft. level, the 1900 ft. level, and so on.

Original Mining Method

The orignal method of working, with the exception of slight deviations due to some local condition which usually occurs in every seam, was to divide the coal into pillars in the first working. As the levels advanced, headings spaced 700 ft. apart were driven on the full pitch of the seam, coal was brought down these places on sheets, by gravity where the grade was sufficient, otherwise by boys called "shovers down". When the heading had reached the level above, sheets were taken up and replaced by track, for a back balance, using a cage. Then bords were broken off on both sides of the balance and driven 350 ft., or until they holed through on the workings coming from the next balance. This procedure was continued until the level had reached the determined boundary, and the whole lift or block of coal between the two levels had been completely

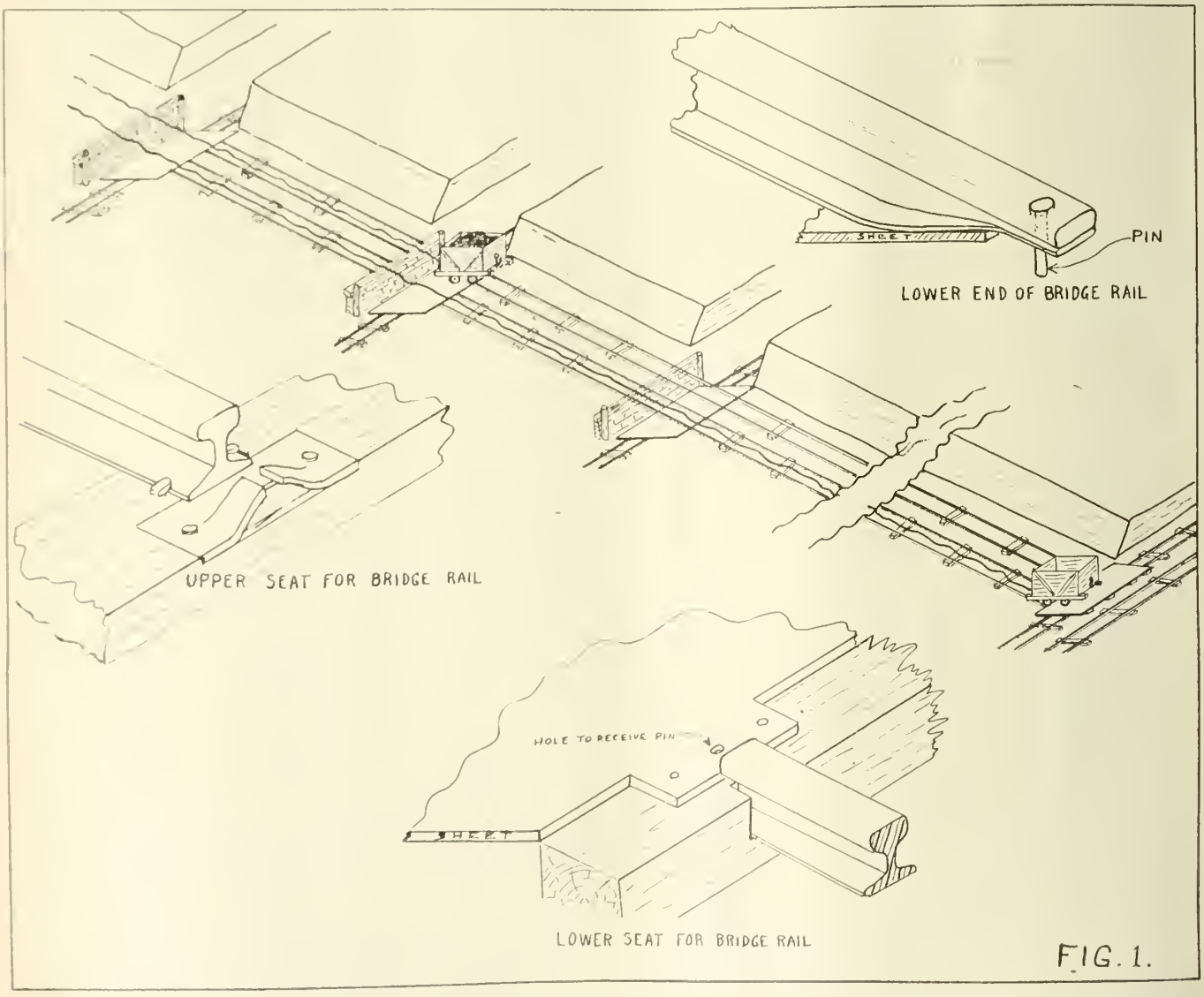


FIG. 1.

* A paper read before the Annual Meeting of the Nova Scotia Mining Society, May, 1922.

divided into bords and pillars. Then, beginning at the inside, the pillars were attacked and brought back toward the slope.

The first pillars were 30 ft. thick, with cross-cuts every fifty feet. These were increased at different times until, at the 3300 ft. level, pillars were 40 ft. by 70 ft. and the width of bords reduced from 12 ft. to 10 feet.

Troubles at Depth

This method worked satisfactorily on the upper lifts; but, as the working got deeper and the cover increased, it was found that before all the pillars could be brought back much of the first working had badly caved, thus necessitating the cleaning up of falls and in many cases the driving of entirely new bords, which were driven adjacent to and on the high side of the old ones. This operation is called locally "ribbing in". In fact, at the 3300 ft. level, where the cover increased to 1600 ft. after suspension of operations for two years due to labor troubles and a series of delays, by the time balances were found to be so badly fallen that before they could begin the pillar work, the whole lift had to be again divided up into bords and pillars.

This experience led to a material change in the method of working. On the next lift levels were shortened, the size of the pillars increased to 60 ft. by 90 ft. and no tight work above the entries (with the exception of an occasional heading to shorten the aircourse) was begun until the entries had nearly reached the boundary and they were ready to come back with the pillars.

But even this change did not have the desired effect. The cover had now reached a thickness of 2000 ft. The floor began to heave badly, with the result that even where the pillar work was begun immediately on completion of the bords, it was found impossible to remove them without much "ribbing in". Trouble from the same cause was experienced on the balances, the heaving of the pavement throwing the track out of alignment and reducing the height so that there was not sufficient head room for the cages. Moreover, the seam developed a tendency to "bumps", and these increased in frequency and severity to such an extent as to cause the management considerable anxiety. It was evident that, if the mine was to be worked at a profit, some radical change must be made in the method of working. Larger pillars could hardly be considered, as already in cross-cuts and pillar work (on account of the flat pitch) the coal had to be shovelled two or three times before it was loaded into the mine cars, and this was a source of constant complaint from the miners.

The New Method

After much consideration and some experimenting the following method was adopted:

Three entries, as before haulage level, water level and counter level are driven to the boundary. Headings in pairs are laid off every 500 ft. but are only driven to the counter level, with the exception of an occasional one to shorten the air course. Between the headings and from the water level or minebord to the haulage level, cross-cuts are driven at 100 ft. centres, thus making the entry pillars 90 ft. by 90 ft. When the entries have nearly reached the boundary, the headings are continued to the level above, beginning at the innermost one and starting the others successively until four are in operation. Coal from the heading is lowered by jig wheels until the headings break through, when the wheel is replaced by a drum. Three landings, forty-five feet apart, are then cut at the top; from these, bords are driven on both sides, making the pillar between them 35 ft. The bords are driven 250 ft. or until they hole through to the working from the next inclines, when the pillars are immediately brought back. The face of the bords and the pillars are kept at least 40 ft. ahead of the bord immediately below, and not more than three landings in one incline are working at one time. As one bord is finished a new one is begun until the coal is brought back to the level.

Haulage on Inclines

The system of haulage on the inclines is known as the ent rope system. One of the ropes has two detachable sections equal in length to the distances between the landings. These are readily detached or connected as the case may require. When running from the top bord both are detached and laid aside, when running from the others one or both sections of the rope are connected according as they are running from the middle or lower landing. The landings are crossed by means of bridge rails. Perhaps this will be shown more clearly by the accompanying illustration (figure 1).

At this point it might be of interest to make a few remarks of more or less theoretical nature. Now at first glance a 35 ft. pillar under a cover of 2,500 ft. may appear contrary to the first principles of mining, but such however, is not quite the case. It is one of the fundamental principles of mining that the size of the pillars must increase with depth; but another principle, equally important but sometimes overlooked, is that the size of pillars depends on the time they are to be

IDEALIZED PLAN OF WORKINGS — No 2 MINE SPRINGHILL N.S. FIG. 2

left standing. It is to the observance of this latter principle that the present system owes its success. The pillars are removed so quickly that the bords have not time to cave.

Another feature which led to the adoption of so small a pillar was the problem of "bumps". It was early observed that these were more severe and occurred more frequently in driving the bords with a small one. As a matter of fact the first pillars were 45 ft. but the bumps were equally frequent and more severe. (See Figure 2 for plan of workings.)

Bumps

Before proceeding it might be advisable to explain just what is meant by "bumps". The terms "bump", I understand, is a more or less local term, used to describe a sudden jarring of the mine, due apparently, to a yielding to some great force in the strata. They occur unexpectedly, without giving any warning, which distinguishes them from other disturbances of a similiar nature, namely, "crushes" and "creeps". Apart from the noise, bumps consist chiefly in upheavel of the pavement and dislodgment of large quantities of coal. They are not generally accompanied by falls of roof except where the roof has been previously broken, in which case there have been falls of considerable extent.

These bumps are accompanied by some very wonderful phenomena. For instance, in one of the most severe, the jar was felt in the town as far back as three quarters of a mile behind the outcrop, and so great as to rattle the dishes on the shelves, while at the same time directly over the workings it could scarcely be detected. At another time a bump occurred in a bord where a pack or crib (7 feet high made of 4 feet sticks) had been built on the high side; after the bump this crib was found tight against the low side with not a stick displaced.

For the purpose of this paper bumps in this mine may be classified as local and general. The former, which are confined more or less to one working place, and invariably in the tight work, consist chiefly of pavement upheaval and displacement of coal. The latter extend over a considerable area, including the pillars, and are usually accompanied by falls of roof. These, as might be expected, have been the most destructive of property but the former have caused the greater number of accidents. I merely make this statement as a matter of record; it must not be construed to mean that the general bumps are inherently less dangerous, for some of the escapes in these have been little short of the miraculous.

Relation Between Pillars and Bumps

Now to return to the relation between the small pillars and bumps. When a portion of a coal seam is removed the remaining coal is subject to abnormal pressure due to the extra weight brought on by the arching of the strata over the waste. This abnormal pressure would be at a maximum at some point whence it gradually diminishes until it reaches the normal. It is evident that this point of pressure is at some point beyond the edge of the solid coal, say "B" in Figure 3, and is continually moving forward. This movement might be brought about in two ways. In the first place by the coal yielding and sinking into the pavement: secondly, assuming point of maximum pressure to be at the base of the arch and that the arch becomes wider as it becomes higher, this causes the point of maximum pressure to be moved forward.

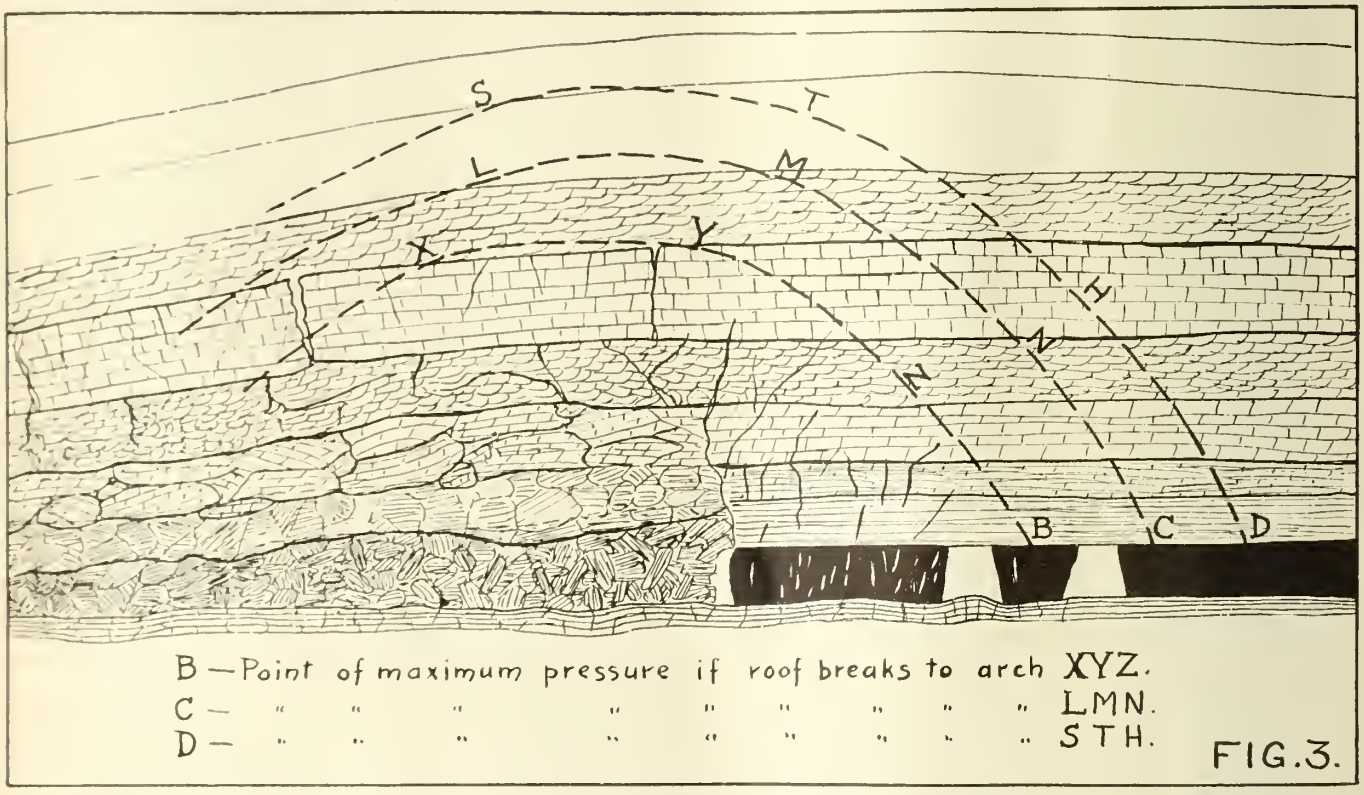


FIG.3.

Now suppose a bord driven in the solid at, or just ahead of, the point of maximum pressure ("B" in Figure 3) where the coal and pavement have not already yielded. As the coal is removed the pavement is free to heave, but being strong, does not do so at once, perhaps not until the bord is driven some distance; then, as it is very brittle, does so suddenly, causing a bump. Had the bord been driven between "B" and the waste, the pavement and coal having already yielded, would not give way suddenly, but slowly, and there would be no bump.

Now while this supposition may be sufficient to ex-

plain small bumps we shall have to seek further to explain the larger ones.

Cause of General Bumps

So far, we have assumed the point of maximum pressure to be moving gradually and the pavement and coal to be yielding suddenly. I think it reasonable to assume that the point of pressure will change erratically. Accepting our previous assumptions, this would be the case if the falls took place in large masses, say by strata; then when a stratum falls the pressure would advance instantly, causing the coal and pavement, which are already near the breaking point, to give way with a bump, the magnitude of the disturbance depending on the thickness and extent of the stratum which falls. From this it will be noted that the prime cause of the disurbance is not necessarily a sudden increase in the pressure, but rather a sudden shifting of its point of application, thus producing a new set of forces to which the strata must adapt themselves. This explanation of the cause of bumps is but a theory, yet it seems to me, presents fewer objections than any other explanation so far offered.

As to the prevention of these troubles, what has been said already will show our method of dealing with the local bumps; but the general bumps, fortunately, have not been of very frequent occurrence and thus do not offer so much on which to base an opinion. So far it has been noticed that where they have occurred, the general line of break has had a decided bulge into the coal. If we assumed a thick stratum, strong enough to support itself and the roof above it, until the bulge has covered considerable area and then gives way suddenly, I think our explanation of these causes not unreasonable. So by keeping the line of break straight and leaving no pillars in the waste we hope to avoid, or at least decrease, their destructive effect.

This is a brief description of the present system of working in this mine and the conditions which led to its adoption. We do not claim perfection for it, since like every other method it has some undesirable features. That there are only six working places in each incline makes the output per incline much lower than if it were practical to use balances with cages; and consequently for a given output, the work is not so concentrated as is desired in good modern practice.

Also, for the same reason, the general line of break makes too small an angle with the strike. While this may not be a disadvantage in the actual working of the coal, it evidently brings too much pressure on the entries,thus making the cost of upkeep rather high.

CORRESPONDENCE

MANICOUAGAN FELDSPAR AGAIN

The Editor, Canadian Mining Journal,
Sir,

I have recently read with great interest Mr. Melkman's letter in your issue of June 2nd.

For Mr. Melkman's sake and for the sake of the feldspar industry I sincerely hope that his statements as to the Manicouagan Bay feldspar deposits are correct.

In drawing attention to our Verona deposits I had no desire at all to disparage those of Quebec. The Verona deposits must, and can, stand on their own merits.

Unfortunately my knowledge of the Manicouagan deposits was limited to the official statements of Mr. H de Schmidt in Mines Branch Publication, No. 401 "Feldspar in Canada". Referring to this deposit, Mr de Schmidt says:

"Beyond shipping a small trial consignment of about "thirty tons to the potteries at Trenton, N.J and also "to England, the owners have carried out no work ... "In 1912... three men were employed for a couple of "months in surface stripping. No machinery has ever been "employed... The deposit consists of a pegmatite body "composed of microcline feldspar and quartz; the usual "mode of occurrence is in small individuals graphically in-"tergrown with quartz; the proportion of feldspar to quartz "in the dyke is sufficiently low were it not for the presence "of too many *injurious accessory minerals* in the dyke mass "to permit of a large amount of the mineral body being "shipped crude with a minimum of hand cobbing, the "percentage of quartz in several zones in the dyke aver-"aging under 10 per cent. The amount of quartz present "in the graphic granite zones would average around twenty-"five per cent, while probably ten per cent. of the run-of-"mine would represent clean spar. Whether these condi-"tions would persist in depth can only be determined by "actual development".

It will thus be seen that I was innocent of all intention of disparaging Mr. Melkman's property.

I may add that, granting the accuracy of Mr. Melkman's claim, the Manicouagan deposit is without rival on either hemisphere.

The Verona spar bodies are known to be large and of high grade. Yet we poor operators are forced to develop them before we know what we have.

Providence seems to distribute its favors unequally.

Yours, etc.
R. F. SEGSWORTH.

103 Bay St., Toronto,
July 14th, 1922.

ONTARIO MINING ASSOCIATION

Annual Meeting at Porcupine

A correspondent gives the following account of the annual meeting of the Ontario Mining Association on July 6th and 7th at Porcupine:—

Outside of routine business and the paper presented by the secretary, which you have printed, there is very little to report concerning our meeting in Porcupine, as it was largely social in nature. The idea in view in having the Annual Meeting in different mining camps, is to draw the operators of the Province together and get them better acquainted, and in this we are meeting with wonderful success and this year was no exception. Practically every producing mine in the Province was represented at the gathering.

We held our Annual Meeting on the evening of July 6th, upon our arrival at Porcupine; on the next day (Friday) the parties visited surface and underground at the McIntyre, Dome and Hollinger mines. In the evening we were entertained at a dance given by the ladies of the Porcupine Camp, and on Saturday the party went by boat up the Mattagami from Timmins to Wawaten Falls where the larger power plant of the Northern Canada Power Co is situated, arriving back at Timmins in the evening, when a banquet was given by the Porcupine operators to the visiting members. The toastmaster at the banquet was Mr R. B. Watson and the speakers were the mayor of Timmins, Dr. McInnis, Mr. A. J. Young, Mr. A. L. Brigham, Mr. G. C. Bateman, Col. R. W. Leonard, Dr. J. Mackintosh Bell, Mr. R. J. Ennis and Mr. J. P. Bickell. The general tenor of the remarks was the necessity of closer co-operation and of educating the people of Old Ontario to the importance of the Mining Industry in the general development of Ontario. During the evening a presentation was made to the retiring President, Mr. R. B. Watson, who was referred to, and properly so, as the Dean of the Mining Profession in Northern Ontario.

BOOK REVIEW

IRON ORE.—Part 1.—United Kingdom. — Imperial Mineral Resources Bureau. 6s. 5d., post free, from H. M. Stationery office, Imperial House, Kingsway, London, W. C. 2. — 237 pp.

The sub title of this volume, "Summary of Information as to the Present and Prospective Iron-ore Supplies of the World," indicates the scope of the series of which this is Part 1. Succeeding volumes deal with British Africa, British America, British Asia, and the British Pacific regions; then foreign countries in Europe and Africa, America, and Asia and the Pacific, respectively. The total of eight volumes will form a veritable encyclopaedia of information about iron ore, with the emphasis placed upon deposits in British territory.

As explained in the introduction to this first volume, the scope of the inquiry of the Bureau has been considerably widened in the case of iron ore at the request of the National Federation of Iron and Steel Manufacturers of Britain, who have provided the additional funds required for this further inquiry. This, by the way, would seem to be a clear indication of the trend of thought of those business men of Britain who are engaged in the iron and steel business. They would hardly care to invest in the compilation of information such as this unless they wished to follow up the investment, and the logical conclusion is that they wish, not only to examine closely the relative position of Britain in world production, but to obtain reliable information as to the possibility of extending their smelting operations throughout the Empire.

The major part of the present volume is devoted to a discussion of the modes of occurrence of iron ore in the United Kingdom, and descriptions of individual beds and deposits. As a preliminary, the nature of iron ores throughout the world is briefly discussed, their geological ages, beneficiation, and the various chief factors determining their economic value.

The mainstay of the iron-ore production of Britain, as of France, is bedded deposits of Jurassic age, characteristically high in phosphorus and rather low in iron, but self fluxing either alone or in mixture. These beds outcrop near the coast and close to productive coal measures. The developed reserves, mainly comprised in the Cleveland ironstone, total 1,200 million tons, and the probable total is three times that amount.

The other important source of ore in Britain is the limestone beds of Cretaceous age, containing the hematite ores of Cumberland and Lancashire. These are non-phosphoric and higher in iron than the ironstone; but they are not so cheaply mined, nor is their extent so large. But there is still an important annual output, and the reserve determined is 45 million tons, with a probability of double that amount.

The report emphasizes the fact that the present difficulties of production of iron ore and its products in Britain are due to labour troubles and consequent high costs, and that under normal conditions Britain can hold her own, for many years to come, as one of the world's chief producers of iron ore.

IRON ORE—Part 2.—British Africa. — Imperial Mineral Resource Bureau — 3s. 3d., post free, from H. M. Stationery Office, Imperial House, Kingsway, London, W. C. 2.—76 pp.

Africa is still, in the main, *terra incognita* as regards its mineral resources, including iron ore. But in the Union of South Africa a certain amount of systematic exploratory work has been done, and this has been sufficient to demonstrate that here lies one of the principal ore-reserves of the world.

Though the deposits are known to be vast, and their quality has been determined in a fairly conclusive way, still they are not yet susceptible to definite estimates of tonnage. Probabilities only can be indicated.

Here, as elsewhere, bedded deposits provide most of the ore available. The Pretoria series of rocks is estimated to contain, in the vicinity of the capital city alone, and by open cast and adit mining, 400 million tons of ironstone ore, with an iron content of 48 per cent. Known occurrences of the same beds elsewhere bring this total to 1,000 millions.

There are numerous smaller beds and sporadic occurrences of hematite ore, all of fair grade and some of them of high grade, and it is these that are at present in use to supply the two small blast-furnaces the Union now possesses.

The great laccolith of South Africa, underlying the Bushweld, supplies one of the largest known deposits of iron ore in the world; but it is titaniferous. It occurs chiefly in flat-lying beds formed by magmatic segregation. Some of the beds are high in iron (60 per cent.), and low in phosphorus and sulphur, with about 16 per cent. titania. The quantity of this grade available has been provisionally estimated at 2,000 million tons.

It seems unlikely that any of South Africa's iron ore will be available for export as such, as its grade and the long rail hauls to the coast will prevent it. But it seems certain that, with ore, coal and fluxes conveniently available, South Africa will soon supply her domestic requirements of iron and steel, and it may be possible to build up a profitable export trade in finished and semi-finished products.

Elsewhere in British Africa the information available is incomplete and rather vague. Exploration only will improve this.

The mining Association of the interior of British Columbia is urging the provincial government to amend the act incorporating professional engineers in order that mining, milling and smelting operations will not come within its provisions. This, it is argued, will be following the precedent set by Ontario which recently exempted the mining business from a similar statute. The association also is asking the Minister of Mines to consult with it before taking action in regard to safety apparatus ordered for metalliferous mines. The Minister of Finance is to be urged to bring the provincial taxation act into harmony wth the Dominion Income Tax enactments.

The experiments of the McMurray Asphaltum and Oil Company at Waterways, Alberta, are showing good results. Tests have been made and from twenty-five pounds of tar sands, two and a half pints of lubricating oil have been obtained. The machinery is now being installed on concrete foundations.

Drilling on the Thompson Oil Company's property on the bird sanctuary near Pakowski, Southern Alberta, has commenced and it is the intention of the drillers to go to a depth of 3,500 feet.

Notes From Nova Scotia

TECHNICAL EDUCATION AT THE COLLIERIES

Mining Examinations at the Collieries

Two hundred mining and engineer students wrote for certificates at the mining examinations held a short time ago in the various mining centres of the Province. It is stated on good authority that those who went up for third class certificates showed marked proficiency, and rank well with the students of the Technical College at Halifax. This is good, considering that nearly all these men work hard all day and can apply themselves to study only in the evening.

The most encouraging feature is the large number of young men who attend the classes and are preparing themselves for their life's work in the mining profession. Another good feature is the increasing growth of the classes during the last two years. During the war period the classes shrunk greatly and the supply of certificated men began to fall below the needs of the collieries. The good attendance in the past two years has proved that we are passing through the reconstruction period, and are regaining the ambition and optimism of pre war days. The development that is bound to take place in the Nova Scotian coal industry in the near future will require men well equipped and qualified to carry on the work of mining. The technical schools of our Province are doing much to help these men and to keep up the standard of education for which Nova Scotia has long been noted.

The work of technical schools forms a large page in the history of Nova Scotia, and the industrial progress of the Province might easily be traced on the registers of these schools. It is not our purpose to do other at present than to make a short reference to the mining and engineering schools which for many years before other technical schools were opened, were of great benefit to the mining industry.

Origin of the Mining Schools of Nova Scotia

The mining schools are the off spring of the Provincial Workmen's Association, the first Miners' Union of Nova Scotia. The object of that organization, and indeed of all other trades unions in the early days, was to promote the well being of its members materially, morally and mentally. In the light of the actions of labour organizations to day in the colliery districts, which claim all these objects but fail to follow the pursuit of them, it is interesting to look back over those early days of struggle. There were giants in those days, and the first members of that association were men of clear vision, strong in intellect and intense in purpose. Their debates would do credit to any similar organization of the present day.

One of their many good mottos was "none cease to rise but those who cease to climb" and under Mr. Robert Drummond, a born leader of men, "climbing" was a very practical part of the work of the organization. The evening mining schools were recognized as a means of rising in the profession. They were introduced and kept going many years in advance of other schools. The instruction was free from the beginning and although some were slow to perceive the benefits to be derived from industrial education, there were others who were quick to grasp the opportunity afforded by the schools and gladly attended them. It would be hard to tell how many miners who were actually illiterate, entered the schools and struggled up in the classes, finally attaining to positions of responsibility at the collieries.

Part-time Schools for Boys

The opening of the mining schools in the colliery districts seemed like the renaissance of the sixteenth century, for everywhere one went mining knowledge was being diffused and mining problems wrought out. In a few years came other industrial schools until they spread all over the Province. Eventually the day schools of large mining centres took up the work of teaching mining science and carried it on with success. Dr. James H. Bingay, Superintendent of the Glace Bay schools, is a most enthusiastic advocate of technical schools, and in an address recently delivered in Truro Academy, he pointed out the necessity for half time schools in co-operation with employers. He stated that in mining centres boys dropped out of school early and in grade ten the girls outnumbered the boys at the rate of two to one. This is one of the educational problems in mining districts. The mining laws of Nova Scotia prohibit boys from entering the mine before the age of sixteen, yet there are scores of boys who do not attend school after they pass the age of thirteen of fourteen. Two of the best years of the formative period of a boy's life is thus mis-spent and by time he is old enough to enter the mine he has lost much of his early education. Surely there is food for thought here for miners and their labour organizations and other institutions interested in the development of the youth of their country and the progress of the industry in which most of these boys will labour during their life. There is certainly something to be done, whoever will do it.

Mr. Drummond the Pioneer

It was in the year 1886 that the matter of forming mining schools in the colliery districts was first discussed. The Hon. Robert Drummond, who was then Grand Secretary of the P. W. A. was instructed to interview the Nova Scotia Government on the subject of mining education. Now as the coal areas of the Province are retained by the Government and leased to operators for definite periods, and as the largest part of the provincial revenue is derived from this source, it was not difficult for a man of Mr. Drummond's ability to persuade the Government that night schools were a necessity. He was able to point out the advantages of having the mines under the control of miners well educated and trained for their positions. Safety, efficiency and sympathetic management were sure to come as a direct result of an educated class of native workers. And the long period of unbroken harmony which existed at most of the Nova Scotian collieries amply justified Mr. Drummond in his argument, and the Government in acceding to his request in opening the schools.

The Teaching Systematized

In 1888 the first mining schools were opened. To secure suitable teachers was the first difficulty to be overcome. The schools were placed under the Mines Department. For a time in some centres instruction could only be given to enable students to acquire second and third grade certificates. Those desiring first class certificates had usually to plod along alone or with such help as they could get from day school teachers and others outside the mining profession. As the first local instructors were men who had to work hard all day, their teaching efficiency was not of the highest, and the Government, after reviewing what had been accomplished since the schools were first opened, decided to establish a technical college in Halifax. The college was opened in 1907 and took over the mining schools, and in each principal mining district a full time permanent instructor was appointed to have general charge

of the work. He is responsible for the efficiency of the training in his own district and he recommends the other part time instructors. He teaches evening classes on coal mining subjects in the mining centres and gives the course in mining science in the public schools. To those who work altogether by night he gives instruction during the day. The instructors now must be men who have passed the examinations for colliery manager, have superior education, ability to impart instruction and at least ten years' practical experience underground in responsible positions.

Elementary Teaching

In conducting the mining classes it was often discovered that some of the students had not sufficient education to take up the subjects in mining and loss of time occurred through the teacher having to teach them arithmetic and English composition. To obviate this delay and to help these students, evening classes were opened where English and arithmetic were taught and mining subjects to-day are only taught to those who can give proof of their ability to enter the mining classes.

In conjunction with the mining schools the school for stationary engineers was opened. This work was carried on in a quiet way for a number of years but, with mining schools, is now under the technical college in Halifax.

The Results

With scores of students out of a working population of twelve thousand passing through the mining schools each year, it is plainly seen that great work is being accomplished. Dr. Fred. H. Sexton, Director of technical education, states that "the coal mining and engineering schools have served their purpose well. They have given the native born miner the opportunity to qualify himself for official positions without losing an hour's wages. They have helped to educate and train the whole body of coal miners into highly intelligent and skilled workmen. Practically all the colliery officials in the Province are Nova Scotians, who have passed through these schools. That the men are highly skilled and intelligent is attested by the fact that fatalities per thousand employed have been lower for many years than in any other Province in the Dominion and lower than the rate prevailing in the United States. The schools have been partly responsible for this enviable record. And when it is remembered that when these schools were first opened nearly every colliery in the Province was officered by mining men from Britain, many of them very capable men, it will be seen how far we have travelled along the way of progress. The schools are making for greater efficiency each year as the standards are gradually being raised."

An Ill-founded Charge Refuted

Some time ago a criticism of the Mine Managers of Nova Scotia appeared in one of the Montreal papers. It stated that we had no efficient Managers, and gave the impression that, such being the case, everything connected with mining was going to the eternal "bow wows". Such things usually come from those who, having acquired a little knowledge, are anxious to impress the general public with their wonderful acquirements. The mine officials of Nova Scotia are hard-working men and keen students of mining, and are as able and well-qualified to develop the coal fields of their native Province and to solve the mining problems met with as are any other mining men in any mining country, and they are doing it well.

If there is any criticism to be made, it probably arises from the method of training through which these men pass as they work their way up. Overmen and Underground Managers have strenuous work in getting large outputs of coal. They have little time to devote to the costs and other essential features of their work, and when their turn arrives to step up higher, they are sometimes without the training and experience that leads to successful management. It would pay every Coal Company to have some system by which each official would have an opportunity to serve a short course of a month or more in an office under the supervision of someone who is capable of instructing him. This is coming to be more and more clearly recognized, and when it is put into practice, the office work will not appear so formidable as it does to men whose early life has been devoted to one long round of toil underground.

The Glace Bay audit office of the Dominion Coal Company has been merged with that of the Steel Company, with headquarters in the General Office at the Sydney Steel Works.

Mr. Robert Gordon, who for many years has been Comptroller of the Coal Company, becomes Comptroller of the Steel Corporation for Nova Scotia and Newfoundland.

The Cumberland and Pictou audit offices will not now be centralized at Sydney, but later on they too will be removed from New Glasgow and all audit work will be done at Sydney.

A heavy bump occurred in No. 2 colliery at Springhill, which, besides displacing a large amount of coal and injuring three workmen, caused earth tremors to be felt all over the town. Formerly bumps were frequent in this colliery but a change in the method of mining seemed to have obviated these disturbing occurrences and it was hoped that the last of them had passed. The latest one occurred in one of the leading places, or in what is known as the solid work. It is in direct line with the bump zone in the upper lift. The roof and floor are much harder here than in most other parts of the mine, which may be a cause of the coal being thrown out when pressure was exerted. The matter may be only local as these conditions of pressure are liable to sudden change.

It seems difficult to eliminate bumps entirely. The improved method being tried out in this colliery has gone a long way towards removing the cause of bumps, and is up to the present time the nearest approach to success of any that has yet been tried.

The Mullens, one of the lowest seams of the Cape Breton coal field, is to be opened up and tested. A short slope will be driven down to ascertain the quality of the coal, and if this is found suitable, greater development may follow. The slope will be sunk in the New Waterford district, a short distance from No. 17 colliery. The coal mined will be used at the large electric power plant at New Waterford Lake. The Mullens seam was supposed to cover a large part of the New Waterford coal field, but recent borings have proved that the facts do not coincide with the glowing stories of some highly imaginative people. What we do know is that the seam is six and one-half feet thick, that it is of fair quality at the outcrop and that while there is a large amount of land-coal, yet like other seams it dips under the ocean and for aught we know may run on to Newfoundland.

The headquarters of the American Electrochemical Society have been moved from Lehigh University, Bethlehem, Pa. to Columbia University, New York.

It is reported that a United States silver export association is mooted in order to cope with the conditions which are likely to obtain when the purchases under the Pittman Act cease to give artificial support to the silver market. Of the 208,000,000 ounces to be purchased under its provisions 116,000,000 had been secured by the 22nd of June.

British Columbia Letter

THE CONVENTION AT NELSON

The Lieutenant-Governor's Address

The International Mining Convention, held at Nelson B. C. on the 3rd, 4th, 5th and 6th of July, has been the outstanding mining feature of the summer season in British Columbia. Delegates were attracted from all parts of the Northwest. There was a representative and very fine exhibition of minerals, contributions for which were sent by the Provincial Government and by many individual mine operators. The proceedings were opened by an address by Lieut. Governor W. C. Nichol, who said that the friendly relations that had existed between the Canadian and American people since the battle of Stoney Creek had been well exemplified in the Kootenay section of the Province. The early mining development of British Columbia had come through prospectors of the Republic. Their capital had made the mineral resources of this country available. As a good Canadian he felt that perhaps it would be better for Canada if more of its mines were financed locally, but there was no doubt that the progress that had been made would not have been possible without the assistance of the enterprise of those living to the south of the line. His Honor thought that there was every indication that increases in the price of metals were permanent and not a temporary phase of economic evolution. It was his opinion that good results would accrue were the Legislature to pass laws protecting the investor in mining stock. There should be some legal assurance that the money spent in the purchase of shares would go to the development of the mining property. "We must have no more such scandalous misappropriation of funds as in the past," he declared. "There should be no possibility of a repetition of the fraud of taking millions of dollars from the people without any return and without a dollar having been spent on the property. There have been such instances and the money has gone into the pockets of the promoters. These things are criminal and the guilty parties should be punished as criminals and prevented from again fleecing the unsuspecting public." Governor Nichol counselled the encouragement of capital. He also expressed the opinion that there should be more marked evidences of friendly co-operation between the nations contributing to the world's output of metal. In most instances each country's mineral wealth varied. The United States, for instance, was the great copper producer, and Canada's chief output was in nickel and asbestos. In mining there was no room for petty jealousies. "The miners of the world," he said, "are wholesouled, genuine, good fellows. The money they make is the cleanest in the world. They take from nature and give to man. To each I give a kindly greeting and a welcome as warm as my heart can express."

The Minister of Mines Optimistic

Hon. Wm. Sloan, Minister of Mines, stated that the mining business of the Province was at the turning of the tide. There had been an abnormal "flow" during the war, bringing with it feverish activity and swollen prices. Then had come the "ebb" tide, and the drop, although in accord with nature's laws, had been unexpectedly severe. Now all signs pointed to improvement. The urge everywhere was towards intensified industrial effort. People were recognizing in all parts of war torn Europe, as in other parts of the world, that, if civilization is to stand, there must be an effort to get the right atmosphere for steady productive work, and there must be good will and place among the nations. This was what those who attended the Genoa convention had been striving for; this was what those assembled at the Hague had in mind. When Europe settled down, economic conditions would adjust themselves and once again there would be a steady demand for the products of the mine.

Statistics were quoted showing that British Columbia's decline in 1921 in point of value of mineral production was not as great as was that of the great mineral States of the Union. The decrease had amounted to about 21.06 per cent. as compared with 77 per cent. in Arizona; 75 per cent. in Montana; 55 per cent. in Utah; 70 per cent. in Washington, and so on. The returns indicated that British Columbia's mineral resources were so varied that a setback in respect of one class of metal because of world conditions was likely to be offset by a stimulus in the production of another. Production was as yet insignificant in comparison with possibilities. If the Province had an important place awaiting her in the development of the American continent it was to be found in the exploitation of her mineral wealth. Within the tremendous territory stretching from the Rockies to the Pacific and from the boundary of the United States to the Arctic there were roughly 550,000 square miles, the chief characteristic of which was mountain ranges. Any intelligent person, Mr. Sloan asserted, must see that the outstanding permanent industry of this area would be mining. Already there had been discoveries of much importance and productive mining enterprises of such volume in output and in returns as to fairly lay the foundations of what would come. There were the gold placers of the Klondike, of the Cariboo and the Omineca, copper mines, or groups of mines in which precious metals were a by product, such as those of Anyox, Britannia, Sunloch and Rossland; a number of lead silver mines or groups with silver as a by product, such as the Sullivan, those found in the Slocan, the Lardeau, etc; and gold quartz mines, of which the best known were those at Hedley and Princess Royal Island.

Encouraging the Prospector

Discussing the necessity for prospecting, Mr. Sloan said that everything possible was being done by the Government to encourage prospectors and prospecting. It was realized that hardihood and technical knowledge were required for success. As a step towards the development of this technical knowledge, winter lectures had been initiated by Government Mining Engineers in all parts of the Province. Last winter there had been a total attendance of some 3000 men at these lectures, which was considered a good start and an encouraging endorsation of the Government's policy. "British Columbia's development," he said, "depends not alone on those of the present but also on the generations to come, and I am in hopes that the practice of lectures in elementary mineralogy by Government Engineers will become a recognized part of education in this Province." He spoke of the exhibition by the Government of mines displays at different mining centres as being another effort to interest the general public in the mineral wealth of the country.

The present tendency among mining men, it was said, was to take up gold and silver properties. Prospects of this kind were in demand. The explanation was found in market conditions. This would not persist indefinitely, however. Just now there was some excitement in the Cedar Creek section of the Cariboo. This region had been worked over, as had the great central plateau, by the prospectors and miners of the middle and later periods of the past century. Gold existed in the placers of that area, and beyond question there were places where the concentration was sufficiently marked to assure profits. Some of the bench lands of Cedar Creek had yielded so well as to encourage the belief that the day of the individual miner with his pan, rocker or sluice box had not passed in the Cariboo. Here, and elsewhere in this region, a revival of interest was manifest and the least that might be expected was a considerable increase in the gold output through greater activity of the placer miner and hydraulic and dredging operations. This stimulation was evident also in the Omineca and the Peace River areas.

"The Wonder Mine"

Turning to lode mining the Minister referred to the "Wonder Mine" of the North, the Premier, which had in the past few months, paid over $900,000 in dividends. (It may be said incidentally at this point that the Premier since has declared a further dividend of $750,000). Mr. Sloan spoke also of the Princess Royal Island Mines, the Nickel Plate of Hedley, the Rossland Mines and others. As to silver properties he thought it good to be able to point to brighter conditions in the Slocan and other camps which for so long have been the backbone of the mining industry of the Province.

It was a mistake, however, to build only on precious metals and, as he had observed, the present tendency would not continue. The real permanent foundation of the industry lay in the development of the copper, lead, zinc etc. These were the industrial metals. The holder of a copper property , for the exploitation of which there might not seem to be much immediate hope, should take heart. His turn was coming. "And then there are the owners of mines in the ore of which is combined silver-lead-and zinc", Mr. Sloan continued. "For years they have been handicapped. They possessed rich ore but, in many cases, the penalties exacted because of the zinc content brought the profit to the vanishing point, if it did not wipe it out entirely. It is a great satisfaction to me to see the announcement that the Trail Smelter, through metallurgical advances, has been able to make more attractive offers to owners of such ores. It is sincerely to be hoped, not only in the interest of the Kootenays but in that of the Province, that the problem relating to the practical economic treatment of these ores has been solved. If this is so, a real service of first importance has been rendered to the mining industry of the country."

Electrolytic Iron at Trail

S. G. Blaylock, general manager of the Consolidated Mining & Smelting Co., made one of the interesting announcements of the Convention, stating that in the laboratory of his Company high grade iron had been made from pyrrhotite gangue from the roe of the Sullivan Mine. An electrolytic process had been suggested by Mr. Nichol Thompson, of Vancouver. This product, which Mr. Blaylock called a stainless iron, could be rolled cold to the thousandth part of an inch and then folded over like paper fifty times. It was the purest form known, and if the Company could develop the process commercially it would be getting out of the ore of the Sullivan mine "about everything but the squeal."

Mr. Rickard on Fraternal Relations

An address by T. A. Richard, of the "*Engineering and Mining Journal-Press*", stirred up much enthusiasm. He spoke of the building up of fraternal relations between Canada and the United States and said that if the world was to be saved from ruin it would be through the use of the English language. Mr. Rickard referred to William Randolph Hearst as a "printing pestilence", who was doing all in his power to stir up feeling against the British instead of working for world peace. He spoke of England as the mother of the commonwealths of the world.

Electric Power and Mining

"What hydro-electric development has done for Mining" was the subject of a talk by Lorne A. Campbell, of the West Kootenay Power & Light Company Ltd. and a former Minister of Mines. He said that the age of power had made possible the introduction of many new and advanced processes in mining and the future would see, through the development of electricity and its application to industry, many important improvements over the methods of today.

The Banquet

At a banquet tendered delegates to the Convention toasts were drunk to the king and President of the United States. The latter was proposed by Judge J. A. Forin and responded to by T. A. Rickard. "Canada" was offered by R. S. Ord, Spokane Wn., who referred to "Our Sister Country and the Land of Possibilities." Alderman Frank Woodside, of Vancouver, president of the British Columbia Chamber of Mines, proposed the City of Nelson in fitting terms, Mayor McHardy responding. "Mining" was offered by Nichol Thompson, M. E. Purcell, of Rossland, responding.

"Lead Smelting Practice" was the subject of an interesting paper by J. Buchanan, superintendent of the Trail Smelter.

One of the features of the Convention was a mineral exhibit which occupied the greater part of the floor space of the Nelson Armory. Each district was represented and special exhibits were contributed by the Consolidated Mining & Smelting Co. and the Provincial Government.

The Iron Ore Survey

Work has commenced by Dr. G. A. Young, of the Geological Survey of Canada, in the exploration of the iron ore deposits of British Columbia. He is assisted by Dr. Hurst, who also is specially qualified for this form of geological research. They now are examining the "Kitchener" deposits. These contain hematite iron running as high as 65 per cent and there are some sixty claims in the property. At some points the vein shows a width of twenty feet and it is quite safe to say that over the prospected area twelve miles in length the vein probably will average 12 feet in width.

New Vein on I. X. L.

The I. X. L. Mine, Rossland has been examined by A. G. Langley, resident mining engineer, recently. The property is under lease by Messrs. Shelledy and Hawkins and other local mining men, from John S. Baker, of Tacoma Wn. A vein of exceptional promise has been uncovered, Mr. Langley stating that the free gold is "standing out in chunks" and that "it is the finest quality of this class of ore I have yet seen."

Northern Ontario Letter

New Vein on Wright Hargreaves

Development work at the 700 ft. level of the Wright-Hargreaves mine has provided one of the more sensational discoveries in the Kirkland Lake field. Lateral work, which was held back for a time owing to bad ground, is now well under way and has demonstrated the fact that the ore which came into the shaft during the course of sinking is a new orebody, distinct from the main deposit heretofore worked. In other words, the Wright-Hargreaves now has two deposits instead of one.

The ultimate value of this development may not be correctly estimated until such time as more drifting can be done, but it is especially important to note that the average mineralization is high and the width compares well with what was formerly regarded as being the main deposit.

Previously, the vein being worked, which has been the source of production up to this time, was regarded as being the continuation of the rich No. 2 vein from the Lake Shore. However in the light of the latest developments on the Wright Hargreaves, it would appear possible that the vein heretofore developed may actually prove to be the continuation of the moderately rich No. 1 vein from the Lake Shore while the latest deposit discovered may prove to be the continuation of the bonanza No. 2 of the Lake Shore.

A Harricanaw Property to be Reopened

A mining plant is to be installed on the Martin Gold Mines at the Harricanaw River district. J.J. Godfrey, president of the Mother Lode Mines, Ltd., has identified himself with the project and is represented locally by Arthur W. Jeffs.

The plant is made up of steam equipment and will be in operation within the course of the next few weeks.

The Martin property is one of the more promising in the Harricanaw River district and has been explored intermittently for a number of years. Gold occurs in narrow pay streaks under favorable geological conditions.

Kirkland Lake Road Extension

An appropriation of funds has been made by the Ontario Government for the purpose of building a graded road to the Bidgood Gold Mines in the township of Lebel. The work will commence shortly and is another step toward extending the Kirkland Lake highway through the more important part of the district.

The question of continuing this work next year rests upon the degree of success achieved in the mean time on properties lying to the eastern part of Lebel and through the centre of Gauthier township to the Argonaut mine.

Reorganization Meets Opposition

The plans adopted by the directors of the Porcupine V. N. T. Mines is arousing considerable displeasure among minority stockholders in Northern Ontario. The conservative element has offered no objection to the drastic reduction in capitalization and the elimination fifty per cent. watering on a big scale. However, it is in connection with the two-year option that is proposed on the remaining 666,000 treasury that objections are being raised.

For instance, Arthur Moysey, if the directors of the Porcupine V. N. T. Mines have their way, is to be given a two year's option on these 666,000 shares at 40 cents a share. The present stockholders of the company are allowed to participate in proportion to stock now held, but all such stockholders will have to make remittance *in full* on or before August 2nd, 1922. That is to say, the shareholders of the Porcupine V. N. T. have two weeks within which to participate in the full number of shares placed in the treasury as a result of the reorganization while Mr. Moysey is given two years. Not only that, but Mr. Moysey's obligations are really optional. He may take up the shares or not, just as he wishes. That is to say, should the mine develop successfully on the money subscribed by the stockholders, it is not unreasonable to suppose that the value of the shares might increase or even multiply. In the latter event, Mr. Moysey would naturally exercise his "option".

Prospecting in Holloway Twp.

Detailed advice received from interested parties carries the information that the mining claims of W. E. Seagers, situated on the Teddy Bear river in the township of Holloway, have been optioned to the Canadian Mining Syndicate of Toronto. The claims were formerly known as The British Bluejacket and there are a number of veins opened up in which gold is visible.

It is also stated that the Manwell and the Harvey Mills groups have been optioned by the Canadian Mining Syndicate, this concern being represented by I. C. W. Holloway.

The rock formation in this district is made up of Temiskaming conglomerate, basalt, semi basalt or rhyolite. Porphyry does not occur in the immediate vicinity.

A force of 25 men are at work trenching and blasting. The work is being handled by Robt. Manwell, formerly engaged at similar work in the West Shining Tree district.

In regard to the options on the above properties the first cash payment has already been made, and the balance is spread over more than a year.

Kirkland Lake Proprietary

Although announcement was made early in June that the Kirkland Lake Proprietary had made its first clean up from the Tough Oakes mill, yet no official figures were made known. It develops, however, that the first brick contained approximately $19,000 and was the result of milling 2,010 tons of ore.

Since that time, development work has been extended from the 400 ft. level to a depth of 750 feet, at which point more ore has been opened up. Indications appear to be that although no effort will yet be made to bring the mill up to full capacity, yet the prospects are good for increasing the grade of the ore and thereby enabling the company to at least pay its way during the period of rebuilding the mine.

The high grade ore encountered on the Proprietary have been found to be quite erratic and this intensifies the problem of setting down into it. Uniform grade

However, the work is in good hands under the management of Mr. Thomas and time appears to be all that is required for him to establish the enterprise on a basis of substantial net profits.

Lake Shore Plans

In an interview with Harry Oakes, president of the Lake Shore Mining Company, the Journal correspondent learned that all due consideration is being given to the question of enlarging the mill. Mr. Oakes stated that the next few weeks would be occupied in enlarging the main shaft from the 400 ft. level to surface. This work will be followed with arangements to continue the shaft from the present depth of 600 feet to the 800-ft. level. In order to carry on this additional sinking and to provide for the broadened scope of operations, the mining plant itself will have to be enlarged. In the opinion of Mr. Oakes, the shaft enlargement from the surface to 400 feet deep should be completed, the mining plant enlarged and the shaft sunk to 800 feet deep before going ahead with an enlargement to the mill.

Everything considered, however, this work should be completed and the mill enlargement made by early in the coming summer. It was pointed out that up until a year ago it would have been unsound to consider mill enlargement. The development work of the past year has greatly improved the situation to the end that already the mine is assured of tonnage that will warrant the erection of a mill of at least three times the present capacity.

During the course of recent work on the rich No. 2 vein at the 600-ft. level, some faulting has occurred in the west drift. In each case, he vein has been re-located without difficulty. Somewhat similar difficulties in the east drift at the 600-ft. level may be left for solution at the 800-ft. level.

A feature of development work has been the discovery of rich ore in vein No. 1, it being noted that about the time values along No. 2 vein commence to rise, the mineralization in No. 1 decreases, with the reverse taking place at such times as values decline in vein No. 2.

Progress in Bidgood Shaft

Good headway is being made in sinking the shaft on Bidgood property from the 400 to the 600-ft. level. Already the work is below a depth of 500 feet.

With the completion of the shaft, a crossent will be driven to the vein so as to develop the downward continuation of ore as found at the preceding levels. The general interest of owners of properties throughout the township of Lebel from west to east is centred to a large extent on this operation on the Bidgood.

New plant for Canadian Kirkland Prospect

The work of developing the Canadian Kirkland property will commence within the next few days provided present financial plans materialize. An excellent plant has been assembled and is now about ready for operation.

This property lies in the southern mineralized belt of the Kirkland Lake district and is known to have good prospective merit. Previous work showed the presence of two extremely strong veins in which the gold content was encouraging.

Teck Hughes

The newly installed hoist at the 550-ft. level of the Teck-Hughes is giving excellent satisfaction and the mine is now in a position to easily keep its mill running at full capacity. It is already evident that the output for July will be highest since December and January last, at which time rich ore was being drawn from the ore-shoot at the 605-ft. level.

This new hoist is good for working to a depth of 1,000 feet and places the mine in such shape that it may be developed to a depth of 1,500 feet under the present arrangement. The decided improvement in the richness of the ore at the 605 and the 730-ft. levels form the basis of optimistic views with respect to the still deeper levels toward which the shaft is being driven.

The general impression is that the Teck-Hughes will find a place among the dividend payers of the coming year.

Another Ore-Shoot at Keeley Mine

Another discovery of silver has been made on the Keeley Silver Mines. The find was was made as a result of a continuous plan of development being carried on concurrently with the work of production.

An interesting phase of the work on the Keeley is that the silver discoveries have been made directly below oxidized sections of the vein. This condition has encouraged further drifting to points approximately at the base of the ozidized sections. Within the next month or six weeks, one of these drifts will enter into a zone where there are good prospects of another ore-shoot being found.

In the meantime, stoping on known orebodies is resulting in sustained production and withal ore reserves are being well maintained.

Nipissing's June Production

Production of silver from the Nipissing mine during June was the second highest record so far this year, being exceeded only during May. As a result of this the company produced approximately 265,000 ounces of silver, valued at $193,324 in June.

These official figures go to show a total output of approximately 1,535,000 ounces of silver during the first half of this year, valued at $1,050,201. These figures compare with the first half of 1921, during which period the production in ounces was lower and the value of the output was less than $900,000.

During June the low grade mill treated 7,244 tons. The high-grade plant treated 160 tons and the refinery shipped 303,188 fine ounces of bullion.

Advertisements other than "Employment Wanted" or "Employees Wanted" will be inserted in this department at the rate of 20 cents per agate line (14 agate lines make one inch). $2.80 per inch, each insertion, payable in advance. Space measured from rule to rule. When four or more consecutive insertions of the same advertisement are ordered a discount of 25 per cent. will be allowed.

Advertisements of "Wanted Employment" or "Wanted word, net. Cash must accompany order. If box number is used, enclose ten cents extra for postage in forwarding replies. Minimum charge 50 cents.

Employees" will be inserted at the rate of two cents a

EDITORIAL

Those who think mining of no advantage . . . assert . . . that miners, because they entrust their certain and well established wealth to dubious and slippery fortune, generally deceive themselves . . . But persons who hold these views do not perceive how much a learned and experienced miner differs from one ignorant and unskilled in the art.—Georgius Agricola—1550. (From Hoover's Translation.)

FARMERS AND MINERS

The importance of mining to the settlement and general development of Canada is slowly—very slowly—penetrating to the consciousness of those not directly connected with the industry. The education of the public in this regard is just being commenced, and continued serious effort will be needed for a number of years to come. We of the mining profession must lose no opportunity for demonstrating to the public not only the possibilities of its development, but the actual benefits conferred today by our production of minerals. Mr. Balmer Neilly's statement to the Ontario Mining Association, which we published on July 7th, is a notable instance of how this relation between mining and the other industries can be made clear to the average man.

Next to the miner himself, the farmer probably derives the greatest benefit from mining operations. Of 73 million dollars, the gross value of mineral production in Ontario in 1920, approximately 26 millions was paid in wages. Of these wages, 9½ millions was paid directly for farm produce—12½ per cent. of the total value of mineral production. The calculation has still to be made as to what fraction of the remaining 87½ per cent. was paid for farm produce through the medium of dividends, compensation, insurance, factories, railway workers, and so on; but the total thus returned to the farmers will certainly reach another 12½ per cent., and may materially exceed that amount. Almost the whole of this is disbursed in Ontario, and most of the small remainder in other parts of Canada. Thus the farmers of Ontario are directly the recipients of at least 18 million dollars annually from the mines of their province.

What do the farmers give in return for this 18 million dollars, won by the labour of miners from the bowels of the earth? They sell their produce, also produced by the sweat of their brows from Mother Nature's bosom, at prices notably above the average. They also buy the products of the mine, as fertilizer, farm machinery, autos, crockery, shingle-nails, or what not. Thus do farmers and miners demonstrate their inter-dependence and their common interest.

But there is a way in which farmers fail to fulfil their part of this social contract. The miners realize where their food-supply comes from, they cannot escape the monthly bills from the grocer and the butcher or direct from the farmer himself. But farmers, except those immediately adjacent to the mining community, do not give the miner due credit for the benefit he confers upon them. They do not realize to what extent the miner provides for the sale of their produce in the best of all markets, the home market. They have not accorded the miner the sympathy and hearty support that is due a fellow-worker and producer from nature's store. If a fraction of the time, energy, ingenuity and money that are now being lavished upon the attempt to remove the cattle embargo in Britain, were spent upon encouraging and stimulating mining development, the investment of effort and money would certainly be surer of profitable return to all our agriculturists, and might even in the immediate future yield a higher rate of interest than the free entry of cattle would ensure. An adequate home market will always be the most lucrative, and to the end of developing such a market our best efforts should be directed.

A direct and obvious duty rests upon the miner in this connection. He must advertise more than he has done in the past. He has been working faithfully, in silence, and without the public appreciation of his efforts that is his due. Mr. Neilly has made a good beginning. He might go farther, and many might join him in educating the public in the facts of the mining industry, which is so vital to the continued and rapid development of our country.

AN AID TO PROSPECTORS

The Ontario Department of Mines has recently made a move that is thoroughly in accord with its progressive policy of recent years. It announces that the Testing Laboratories of the Department at Cobalt, under the direction of Mr. A. A. Cole, are prepared to treat small lots of gold ore, and to return to the owner the value contained less treatment charges. To-day there is reported in our Northern Ontario Correspondence, an instance of the use of this privilege.

A tangible demonstration of the value of a gold vein, such as that afforded by the actual extraction of a gold brick, however small, from its ore, is one of the most effective means of attracting notice to a property. An instance of this was seen in the Schumacher district recently. A property showing unusually rich ore in small lots

whose continuity had not been demonstrated, was offered for sale, and was rejected by a number of examining engineers. The owner had not the wherewithal to open up his claim further. He made a small shipment of ore to Queen's University, Kingston, and received in return, not only the value of the gold extracted, less nominal charges, but an authentic statement of the process of extraction to which his ore had been subjected. The owner has now been able to obtain sufficient financial support to continue the prospecting of his claim.

The actual bullion return from ore treated in these experimental lots is not likely to be large, and the assistance thus rendered prospectors by the Temiskaming Testing Laboratories will neither burden the Department of Mines unduly, nor make wealthy men of mining pioneers. The effect will be principally that instanced above, and the Ontario Government will have the credit of having determined and legitimately advertised certain facts about the prospects concerned. This has been done for a number of years in Australia with marked success, and we can expect a like result in Ontario.

But there is one distinct danger in this move, wherein the public, if forewarned, may be fore-armed. It is a fact, well recognized among mining men but not generally realized by the public, that a small vein of rich ore does not constitute a mine. A recent striking example of this is at Elbow Lake, Manitoba, where Mr. N. A. Timmins, after investigating thoroughly an unusually promising surface showing, has decided that the gold ore disclosed by his work of development does not warrant the further investment stipulated in his option. It is possible that the result of a mill-run on a selected lot of rich ore in the Temiskaming Testing Laboratories might be made the basis of dishonest stock-selling operations, such as has been done in many a similar case in the past, and indeed is being continuously and flagrantly done to-day.

In the hands of competent and honest prospectors, operators, and promoters, the privilege now accorded by the Ontario Department of Mines will be a boon to the province's gold mining industry, and will aid materially in its rapid and consistent development. But we must not forget that unscrupulous persons will attempt to abuse this privilege. It will be incumbent upon those who wish to use the privilege to do all in their power to aid the Department of Mines in preventing its abuse.

THE NEED FOR SPECIALISTS IN IRON ORE

The iron-ore problem is ever with us, and at no time is its solution more pressing than now, when we can ill afford to pay out the huge sum required annually to provide ourselves with this necessity from beyond our borders. Thus every scrap of information that may help us, or any idea that may possibly point the way to a solution, is worthy of close attention.

We print to-day Mr. G. C. MacKenzie's address to the conference on iron ore, held under the auspices of the Minister of Mines in Toronto on July 5th. This is an impartial summary of the present situation, based on the outstanding facts. In common with the majority of those who have studied the question, Mr. MacKenzie finds no immediate solution in sight. However, the solution of a problem such as this is never accomplished until some one provides new information, or demonstrates the commercial feasibility of one or other of the many experimental processes; so that a successful issue rests now, as heretofore, with the experimenter, or researcher, or prospector, who is ready to risk time, labour and money by launching out into the unknown.

Meantime Mr. MacKenzie has a practical suggestion to offer, — a suggestion that is unusually opportune just at present. He points out that we have at present in Canada no geologist who has specialized in iron ore to the extent of making himself completely conversant with our resources of this prosaic but all-important mineral. The geologists in the public service have been shifted from one problem to another, periodically if not annually. If one or more of these geologists were left for a number of years to study iron ore, as has been done with such marked success in the United States, our problem might, by this means, be no problem within a short term of years. We have, up to the present, been merely dabbling in the geology of our iron ranges.

This suggestion is completely in accord with the present policy of the Dominion Geological Survey. As rapidly as it can be practically effected, Dr. Collins is allotting special fields of endeavour to his staff, which they will follow year after year, irrespective of geographic location. The present specialist on iron ore is Dr. G. A. Young, now engaged in examining the deposits of British Columbia. As iron ore is in general the most important of minerals next to coal, and as in Canada it presents by far our most important problem in the mineral industry, there will probably be scope for a number of such specialists during the next quarter-century, both in the public service and in private practice.

THE NATIONAL RESEARCH INSTITUTE

The Research Council of Canada comprises in its organization more than one hundred and twenty-five of the leading scientists of the country. For three and one-half long years the Council has been striving to induce the Dominion Government to authorize the establishment of a National Research Institute. Its efforts have been warmly seconded by practically all representative trade, scientific and technical bodies. Last year the necessary legislation was passed in the House of Commons, only to be thrown out in the Senate. Never has the Canadian Senate proved itself such a mischievous superfluity.

Only the briefest consideration of what is being done in other countries is necessary to show Canadians the fatuity of neglecting scientific and industrial research.

In Great Britain the National Physical Laboratory is equipped, at the nation's cost, to undertake all manner of

physical and engineering research. Specific aid is given in the development of technical processes. Here, and in other institutions organized by the Government, industrial processes are originated, investigated, and improved. Definite encouragement is given the inventor and the researcher. It is known that the Government wishes to stimulate and aid research — and this knowledge counts for much. Great Britain is training a generation of technical men that will, we firmly believe, bring back to the Old Country the industrial leadership that slipped through careless fingers before the cataclysm of 1914.

Far-away India, more alive to the trend of progress than are we, has established a Central Research Institute at Dehra Dun. It is also founding an institute for chemical research. Even Burmah is following suit.

The Bureau of Standards and the Industrial Research Institute at Washington constitute the very heart of scientific and practical research for the United States. Both establishments have been organized and equipped in a manner and on a scale commensurate with the importance of the work that they were designed to promote.

Australia is well to the fore in her recognition of research work. The National Research Institute of Japan is amply endowed and magnificently planned.

In short, everywhere and in all lands save a few of the most backward, governments are hastening to enlarge existing organized facilities for research, or are planning immediate steps to render such facilities available.

It is passing strange that opposition to the creation of a National Research Institute in Canada should have come from the Senate. We expect our Senate to be mildly reactionary, but not to be crossly obstructive. Senators may not be capable of rapid and clear thought, but they are at least ruminative. Perhaps light will come to them only after, and not before, their cuds have been masticated for more than one Session.

Meanwhile it should be borne in upon the Canadian public that scientific research is the only instrument that will enable us rightly to use our natural wealth. Research is not so much a means of enriching classes and individuals as it is a means—the only practical and lasting means—of promoting the general distribution of wealth and opportunity.

Mr. A. J. Balfour (we refuse to use his more decorative new appellative) speaking last year before an English audience, said: "The hope I have for the world is that by "the growth of science, invention will give comfort and "leisure where at present discomfort and labour are the "only means of producing an article, and that the people "will learn how to use their leisure. The idea of pro"gress is based on the work of men who are engaged in "probing to the bottom the secrets of nature."

An adequate Canadian National Research Institute will mean more to the poor man than to the rich man. The Dominion Government could devise no better preventive of unemployment than a handsomely endowed Department, or Bureau of Research.

Progress is possible — doubt it who may — without a Senate, but not with research.

EDITORIAL NOTES

From August 13th to 17th, Canada will entertain excursionists of the American Ceramic Society, who will visit representative feldspar quarries and a number of ceramic manufacturing plants. Technical sessions will be held in Montreal. For the occasion, the *Canadian Mining Journal* will publish, on August 11th, a special *Feldspar and Ceramic* issue, describing the principal developed feldspar and China clay deposits of eastern Canada.

As a corrective to visionary promoters, the example of the Imperial Oil Company's efforts to discover petroleum in North Western Canada is strikingly to the point. The Company has already spent some millions of dollars in geological reconnaissance and in drilling. Its surveying is done from two all-metal monoplanes. So far, in the words of vice-president A. M. McQueen, "we are disappointed but not discouraged." The directors do not for an instant hope for immediate returns, even if oil be struck in abundance. The sole object is to prove the existence of a geological reservoir of oil. Its exploitation will be deferred for many years to come. This should put a final *quietus* on all and sundry promoters of oil companies in a country where it costs as much to move a pound of freight as would move a ton in more benign latitudes.

ADIEU

[Lord Byron, in his impetuous youth, wrote a ditty on this model to the Maid of Athens. Of the two efforts we prefer the following:]

Mine Promoter, ere we part,
Let me keep enough to start
On prosaic work for pay,
By the month or by the day,
In Cathay or Timbuctoo
Where I won't see aught of you.

By those prospects always sold,
Mostly 'cause they had no gold,
By certificates I've got
Which I hoped would make my pot,
I am finished, I am through,
I have had enough of you.

Mine Promoter! if I go,
Think of me when things are slow
Though I fly to Timbuctoo
I'll be thinking still of you
Can I cease to love thee? No!
Mine Promoter! I'll not go!

ANON

Canada's Iron Ore Problem
Beneficiation of Ontario Iron Ores*

by G. C. MacKENZIE

MAGNETITE

As a general statement it may be said that the known deposits of Ontario magnetites are unfit for blast furnace use in their natural condition. There are, it is true, a few isolated and small deposits of high-grade ore, but these do not affect the main result nor are they of much importance because of the very limited available tonnage.

We have, however, a number of iron ranges containing large amounts of siliceous or sulphurous ore, such as Moose Mountain, Tomagami, Atikokan, Goulais River, Mattawin, etc., in Northern Ontario, and several smaller and relatively less objectionable deposits in Eastern Ontario, such as at Bessemer, Blairmore, Belmont, Coe Hill, Glendower, Robertsville, Calabogie, etc.

Comparing the ores of Eastern Ontario with those of the Northern portions of the Province, it may be said that the former have been found to be more readily amenable to beneficiation, while the latter are more easily mined. This is because the eastern ores are of a more coarsely crystalline type requiring less preparatory grinding, while the cost of mining has been relatively high because the deposits are not large. The Northern ores of finer crystallization require more preparatory grinding, but they have been mined more cheaply because the deposits are of considerable size.

The beneficiation of a magnetic ore is, from an engineering standpoint, a comparatively simple operation. The ore is first crushed to a size at which the objectionable gangue is freed from the particles of magnetite, and is then passed through magnetic separators which select the magnetite, allowing the gangue to pass off as waste. The concentrated magnetite is then agglomerated by means of heat to make it suitable for blast-furnace use.

If the original ore requires grinding to say 1/8 inch or finer, it will be necessary to submit the crushed ore to wet magnetic concentration; but if the ore can be freed from its gangue at say ¼ inch or larger size, dry magnetic concentration may be employed. Practically 90 per cent. of Ontario iron ores both east and north require grinding to at least 1/16 of an inch, many much finer with subsequent wet concentration.

The agglomeration of the concentrated magnetite is not as simple an operation as its concentration. The agglomerated product must be strong, porous, and not subject to weathering effects. If properly made, this artificial iron ore is an ideal raw material for the blast furnace, but if improperly made it gives rise to various kinds of furnace trouble.

The purpose of beneficiating any given ore is to make it suitable for blast furnace use, and unless the beneficiated ore can compete with natural ores in quality and price, the venture must prove unprofitable.

Operating Plants in United States

It has been proved in actual practice over a long period of years that under certain favourable conditions a lean iron ore may be mined, concentrated and agglomerated, yielding a desirable product for the blast furnace, and at a cost which enables it to compete with natural ores. The work of the Pennsylvania Steel Company, of Lebanon, Pa., and of Witherbee, Sherman & Company, Mineville, N. Y., are instances of successful operations during many years. At Babbitt, Minn., the Mesabi Iron Company are nearing the completion of a very large plant for the concentration of magnetic ores containing between 20 and 30 per cent. iron.

The favourable conditions under which the Lebanon and Mineville plants have been successfully operated are, large deposits of crude ore which admit of cheap mining, the adoption of most suitable methods of concentration, and a product which finds a steady market because of its desirability. The Mineville plants produce a coarse, crystalline product by dry magnetic cobbing, which does not require agglomeration. The Lebanon plant produces a finely divided concentrate, which is subsequently nodulized. Both the Mineville and Lebanon plants produce a concentrate containing over 60 per cent. in iron and low silica, sulphur and phosphorus.

The Blast Furnace Problem

Some few years ago blast furnace operators in Canada and the United States had no difficulty in obtaining supplies of natural hematite ores from the Lake Superior ranges, which averaged well over 60 per cent. in iron and were relatively low in slag forming elements. Many of these high grade deposits are now exhausted and while for a few years the average ore shipped from the Lake districts averaged 55 per cent. in iron, one is safe in stating that shipments of natural ore in the future will average well below 55 per cent. iron. With the decrease in the iron content there has been a corresponding increase in silica and sometimes sulphur and phosphorus, so that the furnace operator to-day has, on the average, a poorer raw material for his furnace than he had ten years ago, and much poorer than he had twenty years ago.

The decrease in average iron content and increase in average silica content has resulted in more expensive furnace operation, because the furnace-man has to contend with more slag-forming materials, and these in turn require a larger proportion of fuel per ton of ore smelted. Both charcoal and coke have greatly increased in price during the past 20 years, so that the furnace operator to-day has not only a leaner ore, yielding less pig per ton, but more slag to melt which requires a larger proportion of more costly fuel.

If the furnace operator can be supplied with an adequate quantity of beneficiated ore containing over 60 per cent. iron and low in slag-forming elements, he would be able to reduce his fuel bill, and if the beneficiated ore contained very small amounts of both sulphur and phosphorus, he could make a pig iron comparatively free from these elements and correspondingly more valuable. This principle is well recognized in the marketing of natural iron ores and a premium is always demanded and paid for those ores which are exceptionally free from silica, phosphorus and sulphur.

It would appear that all that is necessary is to produce a beneficiated ore better in all respects than the average natural ore in order to secure the highest market price for the beneficiated product. Unfortunately this accomplishment is not easy from a commercial standpoint, and the various attempts made in Canada to produce beneficiated ores have been more or less unsuccessful for many and varied reasons which need not be entered upon here.

* Part of a statement prepared for the conference on Iron Ore in Toronto on July 5th.

Conditions for Commercial Success

It is very easy to adopt a critical attitude over the unsuccessful attempts at beneficiation after the causes of failure are recognized and well known, but at the same time we learn by experience and it may not be out of place to remember a few reasons which have contributed to these failures.

It may seem unnecessary to state that unless the deposit of ore which is to be beneficiated can be mined for considerably less cost than a higher grade natural ore, there can be no profit in the undertaking. For instance, a ten foot vein of merchantable ore mined at a cost of $3.00 per ton might prove profitable, but if portions of this vein required beneficiation such portions would require to be mined at less than half the cost of the merchantable ore.

There would be nothing gained in treating this ore to produce a beneficiated ore that was no better chemically or physically than the average Lake Superior hematites, because its market value would be no higher. In order to compete with the natural ore it must be better in every way if it is to command an appreciably higher price.

The art of concentrating magnetic ores to be a high degree of purity by means of magnetic separators has made considerable advancement in the past twenty years. The process of magnetic separation is, in itself, very cheap, costing but a few cents per ton of crude ore treated, but the cost of separation by magnetic machines is only a small part of the total cost of beneficiation. The heaviest items of cost will be the mining and comminution of the crude preparatory to separation, and the final agglomeration of the concentrate.

The cost of mining depends on so many factors that it is difficult to estimate, although it may be said that unless the crude ore can be mined on a very large scale and by the most favourable methods, the mining cost will be prohibitive.

The crushing and grinding of the crude ore present no problems that cannot be overcome by standard engineering practice, but the cost of crushing and grinding will vary inversely with the magnitude of the operations.

The separation of the magnetite from its gangue by means of magnetic separators is not only cheap, but is easily controlled and is free from those factors which usually affect the mechanical separation of other minerals.

The agglomeration of the concentrate to make it suitable for blast furnace use will be the most costly item after mining. This operation may be carried out by one of three methods,—first, briquetting; second, nodulizing; and third, sintering. Each of these processes has been demonstrated to yield a product admirably suited for blast furnace smelting, and the briquettes, nodules, and sinter have received favourable comment from furnace operators both in America and in Europe.

The briquetting of the concentrate has been practised to some extent in both Canada and the United States, but because the process required a very costly installation and was difficult to control, it rapidly lost favour in America. The nodulizing process has been very successfully applied both in Canada and the United States and has been proved less costly for an equal output of tonnage to install and to operate than the briquetting process.

The advancement made in recent year with the sintering process has, in my opinion, placed this method in front of either of the other two processes. It is much less costly to install and its operation affords a large measure of positive control. The great majority of agglomerating plants in Canada and the United States now employ the sintering process, and while the sinter does not possess all of the physical advantages of the briquettes or nodules, this is more than offset by the lower cost of production.

HEMATITE

Processes for the beneficiation of hematite ore are usually based on specific gravity methods of separation. It is true that the electro-magnetic separation of hematite ores is quite possible, but only as an experimental operation, because the cost would be prohibitive of building a magnetic separator sufficiently powerful to concentrate a hematite ore.

The specific gravity separation of hematite ores depends on several factors. First, that the gangue materials in the ore considerably lower in specific gravity than the hematite; second, that the ore is not readily slimed, i.e. broken to powder; third, that the particles of hematite can be broken free from the gangue minerals in pieces not less than $\frac{1}{4}$ inch.

The general conditions governing cost of beneficiation of a magnetite apply in the case of hematites. The ore body should be extensive and very cheaply mined and the concentrated product must be better than the natural ores with which it will be in competition.

As far as we know at the present time, there is no large body of low-grade hematite in Ontario which offers a better or equal opportunity for beneficiation than any of the numerous magnetic ore bodies.

THE PROCESS OF CONVERTING HEMATITE TO MAGNETITE

There are several localities in Ontario wherein are found impure hematite ores of non-marketable value, and it has been proved that these ores may be treated by a reduction process, converting the hematite to magnetite, and subsequently concentrating the artificial magnetite oxide by means of separators.

The proposal is by no means a new one and much information regarding this process may be gained by consulting a paper by Mr. Wm. B. Phillips, published in volume XXV of the Transactions of the American institute of Mining Engineers.

Mr. Phillips has shown that, given the proper conditions of reduction, there is no difficulty in changing the hematite to magnetite, and moreover conducting the process on a considerable scale. In his article Mr. Phillips states that a ton of magnetic concentrate costing $1.25 can be produced from three tons of crude on the assumption that a ton of crude can be mined for 25c and that 50c will cover cost of reduction, crushing and magnetic separation of the three to produce a ton of concentrate.

The idea was never successfully applied even in the Southern States under the most favourable mining costs and, therefore, would hardly be applicable to our more costly operating conditions in Ontario.

THE BENEFICIATION OF SIDERITE

The Algoma Steel Corporation has conducted large scale operations for some years with the siderite ore of the Magpie Mine, and has demonstrated that it is possible to produce a roasted siderite containing approximately 50 per cent. iron and 4 per cent. silica. The

phosphorus content at 0.012 per cent. is well within the desired limit, but the sulphur content at 0.175 per cent. is higher than is desirable. The roasted ore is stated to be self-fluxing because of its relatively high content of lime and magnesia. If it were possible to eliminate a larger portion of the sulphur in the roasting process, the product would be more valuable.

There is said to be a much higher tonnage of siderite ore at the old Helen Mine than has been so far proved at the Magpie, and if the expenses of mining and roasting the crude can be kept within commercial limits, the treatment of both the Magpie and the Helen siderite would mean the production of a large tonnage of Bessemer ore of fair quality.

The self-fluxing quality of these roasted ores is an advantage only under certain circumstances affecting the cost of limestone flux at the furnace. If the furnaceman can buy a hundred tons of 50 per cent. self-fluxing roasted siderite for a certain sum of money and finds that he can buy a hundred tons of 60 per cent. ore together with sufficient limestone flux for the same sum, he will naturally select the richer ore.

The Algoma Steel Corporation have made considerable progress in the beneficiation of siderite ore, and their persistence in making use of these native ores is highly commendable and should be encouraged. I am of the opinion that if the sulphur in the raw ore can be eliminated to a larger extent than they have so far succeeded in doing, either by improved methods of nodulizing or by the adoption of the sintering process, that a much larger tonnage of roasted siderite could be marketed in Ontario.

METALIZING OR PARTIAL REDUCTION OF IRON ORES

Various attempts have been made in the beneficiation of low-grade iron ores to produce what is called iron sponge or metallized ore by a process of partial reduction carried on either in a rotating tubular kiln or in a long tunnel furnace through which the ore is carried in suitable receptacles.

These processes aimed at producing a semi-metallic product which, after cooling and crushing to free the metallic particles, would be amenable to separation by magnetic machines. The separated metallic concentrate would then be available for smelting in a blast furnace.

The experimenters with these various processes have been metallurgically successful in the production of granulated or spongy iron from ores, but the commercial practicability of the undertaking has never been demonstrated. It is extremely doubtful whether these processes could be made apply with any degree of commercial success to our low-grade ores of Ontario.

Briefly summarizing the problem of beneficiation, the conditions for successful operation in competition with natural ores may be stated as follows:—

(1) The ore deposit must be of sufficient size and its location convenient to rail and water transportation to admit of very cheap mining on a considerable scale.

(2) The physical and chemical characteristics must be such that beneficiation will result in the production of a concentrate that is higher in iron and lower in slag-forming elements than the average natural ores.

(3) The agglomerated product must conform to certain physical and chemical standards required by the furnace operator, which are, strength and porosity and freedom from excess of iron silicate.

(4) The concentrated and agglomerated product must be produced at a cost that will permit of its competition with natural ores in the open market.

It is of interest to note that the Mesabi Iron Company, of Babbitt, Minn., believe that they possess all of the above favourable conditions for the production of a beneficiated ore from a crude magnetite containing between 20 and 30 per cent. of iron. The operations of this Company will, therefore, prove of considerable interest to Canadians.

SMELTING OF TITANIFEROUS MAGNETITE

A large amount of experimental work has been done on the smelting of titaniferous magnetite, and it has been shown that given proper conditions of slag composition, there is no great difficulty in manufacturing pig iron from ores containing as much as 6 per cent. titanic acid, although it has not been proved that foundry iron can be made with this amount of titania in the mixture. The pig iron produced from ores containing as much as 6 per cent. titania is usually white or low silica iron owing to the necessity for operating the furnace at a lower temperature than would be required in the manufacture of foundry iron.

Any experiments with the smelting of titanic ores must necessarily be conducted in a blast-furnace, on a large scale, if valuable deductions are to be obtained. The smelting of small amounts of titanic ore in a laboratory furnace, while undoubtedly interesting, cannot duplicate the conditions under which a blast-furnace is operated and the results obtained are apt to be misleading.

Experimental smelting of titanic ores in a modern blast-furnace is a very costly business, and I am of the opinion that this problem will receive very little serious attention from blast-furnace operators until the supplies of all other ores are not readily available.

ELECTRIC SMELTING

Some years ago the prospects appeared bright for the smelting of iron ores in Ontario by means of the electric furnace.

The early experiences at Sault Ste. Marie and at Welland lead to the belief that under certain favourable conditions we might expect the electric furnace to compete with the blast furnace. These conditions were and are:—

1st: Very cheap electric power.
2nd: Expensive coke and other fuel.
3rd: A supply of cheap and comparatively high-grade iron ore.

All of the above conditions are met with in Sweden and Norway, but up to the present time these conditions have not been duplicated in Canada or the United States.

During the war and for a short time afterwards it was found practicable to manufacture a desirable brand of low-phosphorus pig iron in the electric furnace. The melting stock consisted of low-phosphorus steel turnings and the operation consisted of simply melting these turnings and carbonizing the molten metal by the addition of coke or other carbonaceous material. The process was not smelting, as we understand that term, and the amount of slag made was negligible.

The melting of steel turnings and their conversion to pig iron in the electric furnace proved commercially successful as long as the low-phosphorus pig iron commanded a price of over $60. a ton but as soon as the market price of the pig iron fell below $50. a ton the operation was not profitable.

Keeping this fact before us, it is clear that if we substitute a 65 per cent. iron ore with its slag forming constituents for the 99 per cent. steel turnings, and with

the market price for low-phosphorus pig iron at $30. a ton, there is no prospect for commercial electric smelting of iron ore *unless* electric power can be obtained for something less than $10. per h.p. year or until the blast furnace operator is forced to pay something over $15. a ton for his coke.

CONCLUSIONS

Reviewing the whole problem in the light of past experience, we can make the following general observations, which appear to be the governing factors affecting the utilization of Ontario iron ores.

Raw Material

(1) We have at present no known deposit of merchantable iron ore sufficiently attractive to induce capital to undertake its development.

(2) We have large bodies of both low-grade magnetite and siderite ores which we know can be beneficiated to a merchantable grade.

(3) The utilization of our low grade hematites and titaniferous magnetites does not look attractive because the art of beneficiation of these ores has not, as yet, reached a successful stage.

(4) Our deposits of bog ore are negligible and need not be considered from the standpoint of tonnage production.

Beneficiation

(5) Of the various processes described there are only two which merit serious attention at present, i.e. magnetic separation, and calcining of siderites.

Smelting

(6) There is no immediate prospect that the cost of electric power will be reduced low enough to admit of electric smelting, nor is there any immediate prospect that the cost of coke or other fuel will advance to a point which will admit of the electric furnace competing with the blast furnace, at the present cost of electric power. It may, therefore, be assumed that the blast furnace will remain the only practicable smelting agency for some time to come.

Government Assistance

A review of the bounties paid by the Ontario and Canadian Governments indicates that the iron industry in Ontario has received a large measure of Government assistance in the past, although not sufficient to offset the amounts that might have been expended in Canada for labour and supplies had the Ontario furnaces been supplied with domestic ores.

It is generally recognized that if the iron industries of the Dominion had not been assisted and built up by the Government bounties in the past, these industries would not have been in a position to meet the extraordinary demands for iron and steel during the war, and that Canada could not have developed as an important factor in munition supplies.

As a National Policy the old bounty systems were undoubtedly wise precautions, because the country was enabled thereby to produce its full quota of iron and steel so necessary for the successful prosecution of the war, and the business resulting from Canadian supplies of iron and steel during the war period was in amount vastly greater than the comparatively few millions expended in bounties.

The country, while not exhausted by its war effort, is nevertheless impoverished to a considerable extent, and all Canadians are demanding the practice of the strictest economy on the part of the Federal and Provincial Governments. Under these circumstances, it would be difficult for any Canadian Government, Federal or Provincial, to convince the electorate that a new system of iron bounties is necessary, even from the standpoint of a National Policy in preparation for future wars. Whether the adoption of new bounties can be urged from a strictly economic point is a debatable point, and very convincing arguments would have to be presented in justification of an iron bounty at the present time. Those who are advocating a renewal of the bounty system should, therefore, be prepared to show conclusively that under the present abnormal conditions there would be an improvement in business generally. In other words, it must be shown that our blast furnaces will use native ores to at least 75 per cent. of their capacity, and that any surplus would find a ready export market. Only in this way will a Government be convinced that stimulation of native iron mining will result in the distribution of large sums of money for both labour and supplies. There is no guarantee at present that Canadian furnaces will or can use a large tonnage of native ore, nor could that guarantee be expected until there is a decided change for the better in the iron and steel markets of the world.

A Practical Suggestion

I am of the opinion that the only logical measure of assistance to be expected of a Government at the present time is in more extensive geological exploration. Neither the Federal nor the Ontario Government have ever made a detailed study of our iron ore resources under the direction of experts specially trained as iron ore geologists. It is true that a large amount of geological work on various iron ranges has been accomplished, but this work has always been of more or less intermittent character and the geologists employed may have worked one year on the iron ranges, devoted the next year to the silver fields and the third to the nickel ranges.

The known iron ranges of Ontario cover a very large area and the unexplored regions of Northern Ontario cover a much larger area. If we cannot find merchantable ore in our known ranges, is it beyond possibility that we may discover merchantable ore in the unexplored regions? I believe that a corps of trained geologists working steadily for five or ten years over both the known and unknown areas of Ontario would would be of incalculable benefit, and if their work could be supplemented with a generous measure of diamond drilling carried out under their direction, I believe that our iron ore problem would disappear in perhaps ten years time.

I would, therefore, propose that a Committee of Geologists from both the Federal and Ontario Departments be appointed to consider the practicability of more extensive geological study of our known iron ranges, and to report on the possibility that systematic exploration over new areas might disclose valuable bodies of merchantable ore.

REVISED GYPSUM SPECIFICATIONS

A list of the specifications tentatively recommended by the American Society for Testing Materials was published some weeks ago in the *Canadian Mining Journal*. These were somewhat altered and added to by the Society's Special Committee, C-11, whose report was submitted last month at the Twenty-fifth Annual Meeting.

No material is now to be considered gypsum that contains less than 61.5 per cent. by weight of the pure mineral.

Crushed gypsum is to pass through a 2-inch ring, instead of a 1-inch ring. Not less than 10 per cent. is to be returned on a No. 3 sieve.

PORT ARTHUR NOTES

BY J. J. O'CONNOR

The old Huronian mine has been looked over recently in the interests of Pittsburg, Pa., parties. The property is located in Moss township, about 60 miles northwest of Port Arthur, and about 8 miles south of the Canadian National Railway.

The discovery was made by Indians in the employ of the Hudson's Bay Company, in the winter of 1870-71. Mr. Peter McKellar, of Fort William became interested in the lode, and through his efforts, work was started in 1872 under the direction of Captain U. B. Frue, then in charge of operations at Silver Islet. These operations continued from January to March 1872, when the hostile attitude of the Indians under Chief Blackstone drove the miners from the property. During this period about 100 tons of ore were taken out that showed an average value of $500. per ton. Later, a shaft was sunk to a depth of 150 feet and considerable lateral work done, and a ten-stamp mill erected.

There is a splendid vein system on the property, in good gold-bearing formation, that gives promise of satisfactory results on development. The well-informed have every confidence that it will give a good account of itself on intelligent development.

The Shebandowan Lake region, west of Port Arthur, is attracting considerable attention, mainly through the discoveries of large bodies of high-grade nickle ore made by Julian G. Cross, E. M. and his brother. The deposit is of great extent, and has had thorough surface exploration, with highly satisfactory results.

Prospecting in the Island Falls district is very active, several parties are in the field, and a large number of claims have been recorded. These are mainly restakings of old claims located some years ago, and abandoned by their owners on account of want of transportation facilities and other handicaps of the early days. Samples being brought in would indicate good values in large bodies, that give promise of this field developing into a prosperous mining camp in the near future.

Developments in the Schreiber field are proceeding most satisfactorily. Every day seems to add to the possibilities of active mining on a large scale being undertaken in this area at an early date.

A story sent out recently regarding an alleged find of sensational gold values northwest of the town by D. McQuaig, is wholly without foundation. Present developments in the Schreiber field are sufficient to satisfy even the sensationalist, and it is unfortunate that such stories get abroad.

MINING EXHIBIT IN NEW YORK

At the Eighth Annual Exposition of Chemical Industries, to be held at the Grand Central Palace, New York, September 11-16, there will be many exhibits of general interest, and numerous exhibits of specific interest to miners and metallurgists.

The Exposition has become a centre, on this continent, where new and improved mechanisms and processes are demonstrated to the technical public. Here there may be seen at a glance the latest developments in applied chemistry, mining and metallurgy, illustrated by full-size equipment, working models and similar facilities, under the supervision of trained attendants.

Among the 400 exhibitors, there are about one hundred whose concern is, wholly or in part, with mining. Exhibits of ores and other raw materials, water powers, etc., have been provided by governmental authorities. The recently organized Technical Photographic and Microscopical Society will present an exhibit, and Metallography will be well represented. Fuel economy, dust explosions and fire prevention will have prominent places.

Mr. Herbert H. Hoover heads a distinguished list of speakers, among them several well-known in the field of mining and metallurgy.

A notable part of the entertainment provided is the moving pictures. Asbestos, nickel and Ontario gold are prominent in the list, which contains also copper, sulphur and petroleum as subjects.

The exposition promises to be, this year more than ever, of prime interest to the miner and the metallugist, as well as to his brother engineers in other lines.

CANADIAN MEETING OF THE AMERICAN CERAMIC SOCIETY

A large number of the members of the American Society are to gather in Rochester, N.Y., on August 13th, and leaving there on the same day, visit Montreal, Ottawa, Verona, Kingston, Toronto, Hamilton, and Niagara Falls.

The official itinerary is as follows:—

Sunday, August 13th—Leave Rochester, Boat, 10.45 p.m.

Monday, August 14th.—Montreal.

Tuesday, August 15th—Montreal.

Wednesday, August 16th—Leave Montreal, 8.30 a.m., arrive Ottawa, 11.30 a.m.; inspect quarries and plants.

Thursday, August 17.—Leave Ottawa 10.40 a.m., arrive Verona 2.34 p.m., inspect Richardson Quarry. Leave Verona, 6.35 p.m.; arrive Kingston 7.35 p.m. Leave Kingston 10.30 p.m.

Friday, August 18th.—Arrive Toronto, 7.30 a.m.

Saturday, August 19th.—Leave Toronto, 9.15 a.m.; arrive Hamilton 10.15 a.m. Leave Hamilton, 2.30 p.m.; arrive Niagara Falls, 4.15 p.m.

The total transportation outlay for each individual is $36.10. The estimated expense including hotel, travelling, etc. is placed at $100.

THE USES OF LIME

A bulletin issued by the United States National Lime Association, "An Outline of the Uses of Lime," contains an unusually complete list of the purposes for which lime may be used.

Touching first on agricultural uses, it is pointed out that the use of lime enters into all phases of crop and stock production. As an essential to plant growth its functions are well enough known. It is also an important constituent of insecticides and is directly a protective. It plays an important part in animal growth, protection and sanitation, and in the composition of animal products.

In the making of mortar, plaster, concrete, stucco, brick and special paints, lime is a prime necessity.

Its chemical and chemico-industrial uses are so numerous and so important that without it our industries would be helpless. Its functions in metallurgy and electro-metallurgy are too well known to require more than mention.

News and Comments

By ALEXANDER GRAY

"WHIPPING THE DEVIL ROUND THE POST"

Associated Goldfields of Larder Lake Directors "Deny the Allegation and Defy the Alligator."

A change of heart on the part of *The Financial Post* of Toronto — due no doubt to ex-parte representations — prompted it to publish the following:

Associated Directors Answer Gray

"Direct and pointed refutation of charges and criticisms in connection with the Canadian Associated Goldfields, made by Alexander Gray, in an article in *The Canadian Mining Journal*, and referred to by *The Financial Post's* mining correspondent last week, is given by officials and directors of the company. The board includes a number of men of financial and business responsibility in Toronto and the statements they have made to *The Financial Post* carry conviction that they have honestly administered the affairs of the company in the interests of the shareholders.

"The directors declare that they parted with Geo. Gray — an engineer quoted in the article — 'because they considered him disloyal.' 'It is not to be expected,' they say, 'that Geo. Gray either had in his possession, or submitted to the other Gray such confidential information as the assay plans of the company, and even had these values been correct, such conduct would have no other effect than to disgrace the man who would betray such a trust.'

"*The Financial Post* is informed by the directors that Canadian Associated Goldfields 'has not sold a share of stock for two and a half years and has considerably over $500,000 cash on hand to-day and not a dollar of liability.' This statement is made in reply to references in the article in *The Post* to the company's stock selling campaign. Further it is stated that the company never sold a share of stock either in Pennsylvania or Massachusetts; there are comparatively few shareholders in New York and only one of these described as a farmer. The records indicate that sixty per cent of the stock of the company is held by business men in Toronto.

"It is explained that while many shareholders have visited the properties of the company, they have all done so at their own expense. As to work on the Kerr-Addison property, it is explained that operations were merely suspended to concentrate on their adjoining property which holds forth promise. In this course and in other things the company's policy has been decided by the directors in the interests of the shareholders—and the directors report no indication that this policy has met with any criticism worthy of attention."

The foregoing is one of those artifices which would make it appear that Mr. George Gray is a co-defendant, or the only culprit, or is one who ought to be excommunicated from the Profession of Mining Engineer for having maintained his own integrity and steadfastly declined to suppress the facts. It was assumed the Associated directors would do something of this sort in order to confuse the issues and becloud the record. They have attempted to calcimine themselves, whereas disinfectants would be more appropriate in view of the complete record as it exists in my possession. They may strive to discredit Mr. Gray, a reputable Mining Engineer, who had the moral courage, reinforced by ability, to adhere to his convictions, and who resigned rather than submit to wasteful operations which demonstrated an utter lack of discretion—to put it mildly.

In the conduct of Associated operations, Mr. Gray played an honorable part. He proved the properties he was chosen to manage to be so discouraging that he would not assent to the further fruitless expenditure of public money. In this he confirmed the judgment of Messrs. De Pencier and Smith, and for his complete justification I am prepared to submit to the Ontario Government or any impartial commission the assay plans of workings and drill cores, which eloquently portray the indifference with which a large sum of public money was handled.

Whether shares were sold in Pennsylvania and Massachusetts, Timbuctoo, Thibet or Slovakia, is a pettifogging diversion. The distribution was sufficiently widespread—and there still remains a supply in the treasury and in "the pool." Solicitude lest Mr. Gray be "disgraced" by the demonstration of his probity, is more humorous than convincing. His actions stamp him as the clean member of an honorable profession. Nor is it admissible that the Kerr-Addison property "operations were merely suspended to concentrate" on an "adjoining property which holds forth promise."

The detailed record shows why work was stopped (and should have been stopped long before) on the Kerr Addison. The report made by Clifford E. Smith to Director Gundy and others, was condemnatory. Undoubtedly shareholders assented to the policy of the board, but that is not a mitigating circumstance. Shareholders were led to believe the properties were disclosing great tonnage of profitable ore. The assay plans demonstrate the contrary. When Mr. Smith suggested a modest expenditure, instead of continued operations on a scale that was altogether unjustified, it was President Mackay who persisted in the plan to sink a shaft, his excuse being 'the shareholders want it." He passed the buck to shareholders—and now he would throw the responsibility upon Mining Engineers.

In refusing to draw a salary for what promised no adequate return to the company, having repeatedly represented the facts of mining position, Mr. George Gray was loyal to a company that had hundreds of thousands of dollars in the treasury that could be devoted to a better cause. He was loyal to himself and to the public. He would have been recreant had he sanctioned further expenditure, where too much already had been wasted. The intimation conveyed by the directors that work may be resumed at the Kerr Addison and payable milling ore developed in quantities sufficient to feed a mill, is added proof that the sanity of someone needs expert consideration.

Will the Directors of the Canadian Associated Goldfields of Larder Lake admit their errors and abide by the decision of any impartial committee of officials or others if it is decided that their own assay plans sustain every

statement made by the writer as to the unworthiness thus far of the Kerr-Addison, Reddick and Harris-Maxwell properties for mining and milling purposes? They can make a virtue of necessity, and can manifest contrition in the disposition of the "considerably over $500,000 cash on hand to-day". Those of us who would establish standards of mining integrity, will hasten to make amends if there is any proof that the mines for which between a million and two millions was raised are economically other than a horrible example.

"Private" Mining Enterprise at Public Expense

In this connection, and owing to "explanations" emanating from another source, I am reminded that Bagstock was a Kindergartner when it comes to "slyness". He qualified in the "devilish sly" class; but he did not have the advantage of the myriad examples afforded by promoters whose formula, as George Ade puts it, is "aqua pura by the hogshead" and "created wealth by the purely lithographed Method."

In one haunt of the Cult Come On, "Slim" is deemed more expressive, and of deeper significance. At any rate "slim" is sufficiently synonymous and may as well be adopted for illustrative purposes in connection with the performances of non-casuists who have none of the qualms of those who "ne'er felt the halter draw with good opinion of the Law." They may have "erred and strayed" as "lost sheep", but they did it "privately" and are to be forgiven for taking the wrong road and what public money there was along the route.

To be explicit: There is more than *naïveté* in the contention of a North Country weekly journal, that there is no earthly reason why Attorney General Raney should intervene in the matter of the Canadian Associated Goldfields of Larder Lake; because the claims made and shares sold were entirely "private". The $30,000,000 capitalization was merely incidental — *pro forma*, as it were — a means, not an end — to "clean up" matters, as one director expressed it.

By "private" arrangement, and as a special favor, Associated shares were delivered for public cash (it is none of your business whether the capital liabilities are really nominal, or whether the reported "Fixed Assets", approximated at about $23,000,000, are rather unreal.)

Possessing a charter, an ocean of *aqua pura*, certain immovables and intangibles, Government having sanctioned the incorporation, the plea in justification entered is that it was perfectly proper and legal to ignore ordinary avenues of distribution and discreetly to dispose of shares by "private" sale, the President incidentally picturing the wealth in reserve and the 10,000 ton mill in the offing. Ore galore, a fat treasury and a fair wind, the skids for the cargo may be said to have been scientifically slickensided.

It is argued this "private" affair was a strictly "en camera" novelty—not exactly "bouffé"—and yet there are those who hold it worthy of further stage-setting. Mining Finance of the sort certainly is among *les Beaux Arts*. There is a charge for admission, and egress is unattainable "during the life of the pool". The outstanding feature of the "private" exhibit is that the public interest is locked up—"pooled" in aqua pura—and the portion of the public involved becomes somnolent under the mesmeric spell of those who serve the incense and chant the Jubilate. The public get the sockdology—the 10,000 ton mill is a castle in the air.

Manifestly the journalistic counsel for the defense makes the best of a weak case. If the demurrer is sustained by implication and there is no redress at law, there is every reason for another increase in Associated Goldfields capitalization and further "private" performances. The Government may obtain more fees.

Larder Lake "home brew" finance is apt to be popularized if this precedent is confirmed, even by acquiescence. The possibilities are tremendous—an army of canvassers can have steady employment so long as the public survives. Already solicitors are busied with shares, on salaries and commission. So long as there is no misrepresentation, no crescendos where diminuendos are in order, this phase of speculation is beyond control, once Governments license companies.

Grover Cleveland once declared, "public office is a public trust." Likewise "private" promotions can be "private snaps."

"Home brewed" script might become too plentiful. Germany has 170,000,000,000 marks. Russia's diurnal rations in rubles run into trillions. Unless printers should strike, "private" share issues can run by editions.

Somewhow, however, it seems as though the "Wildcat" was not so far off when he soliloquized: "Got me single troubles now widout hitchin' on any double extry."

Finding Canada Worth the Money

Lay newspapers, bankers and a section among Quebec politicians who decry the "mining risk," have a thought or two conveyed to them in the advent of the Anaconda Brass Company and the admirable enterprise of the Johns-Manville Asbestos people. Anaconda Brass will locate at New Toronto. The Canadian Brass Works engaged in fabricating Canadian products *non est*, as yet. Anaconda has industrial leaders *par excellence*. They have copper and zinc and lead. They are exploiting these metals and creating bulk consumption, while Canada prefers to serve them raw—a crudity that is being rectified in the Asbestos Industry.

For some time it has been keenly felt that more producers of Asbestos ought to follow the load of Keasbey & Mattison and establish Canadian fabricating plants. Certain American producers had advantages in that they sold to themselves their own crude materials at an f.o.b. valuation. Quebec authorities were rather resentful. American interests remained obdurate. Consequently complications arose and special taxation was mooted. Now, however, with Keashy & Mattison and the Johns-Manville companies prepared to meet the natural desire of Canada, it is possible the Asbestos Industry in Quebec will be a complete operation to a still greater extent.

The Johns-Manville people are about to construct a plant in which considerable of their own output will be handled. It was the intention to do so before, but conditions did not warrant it. What is more significant, is the option taken by the Johns-Manville interests on holdings of the Bennett-Martin Asbestos & Chrome Company. The option includes the two Bennett-Martin mills, the terms providing for a three-year lease with the privilege of purchasing for $2,750,000.

Obviously Johns-Manville and Keasbey & Mattison are alive to the benefits derivable from complete operations in Canada and untrammeled entrance into the markets of the Empire. There are progressive American business men who do not hesitate to take a risk in Canadian Mining Industrialism.

The Okanagan Coal, Oil and Gas Co. has recently been incorporated at $1,000,000. A number of claims have been leased and machinery ordered. Drilling is to commence immediately near Armstrong, D.C.

News of Mining

United States

From official statements issued by the U. S. Geological Survey, we learn that, due to coal miners' strikes during the year 1920, the average number of days lost per man employed throughout the year was 7.5 days. In the anthracite mines, employing relatively few men, the average loss was 12.5 days; in the bituminous mines, 6.4 days. The total man-days thus lost was 5,914,473. Loss from other causes amounted to 55,733,000 man-days, all out of 241,657,000 man-days offering. The man-days lost through strikes in 1919 numbered 15,525,857.

The existing administration of the American Smelting and Refining Company won a decision victory over the faction that proposed to replace it. The Messrs. Daniel and Simon Guggenheim remain on the board of directors, and Mr. H. A. Guess is confirmed in his position of vice-president in charge of metal mining operations.

Despite Senate opposition, the Federal appropriation of $400,000 for research work in connection with the production of helium has been made available.

Dividends paid by 13 mining and metallurgical companies in the United States during the month of June amounted to $5,519,327. Of these companies The Motherlode Coalition contributed the largest amount, $1,250,000, American Smelting and Refining coming next with $875,000 and Utah copper with $812,245.

An employee of the United States Bureau of Mines, at the Evansville, Indiana, Safety Station, recently removed several ounces of nitroglycerine from a safe that had been drilled and made ready for blowing open by burglars. The nitro was removed by dissolving it in alcohol and ether.

The bituminous coal miners of the United States have lost, during the past 30 years, 4 days out of each 10 of possible employment.

The appropriation for the work of the United States Bureau of Mines, as from July 1st, 1922, to July 1st, 1923, is $1,580,900. The largest single item is that of the operation of mine rescue cars, $211,000. For mining experiment stations the appropriation is $170,000. The supervision of oil and gas leases is provided for with $123,490. For the economic studies of petroleum the sum of $40,842 is apportioned.

For the week ending July 1st the United States mint purchased 160,000 ounces of silver, bringing the total purchases under the Pittman Act up to 116,197,506 ounces. Less than 92,000,000 ounces are now to be bought under the Act.

The average price of silver (foreign) at New York during the month of June was 71.149 cents per ounce. The London average was 33.900 pence per ounce. Sterling exchange averaged 444.615 as compared with 377.236 during June, 1921.

New York electrolytic copper prices averaged 13.575 cents per pound during June, the highest average of this or last year. Lead averaged 5.715 cents, also the highest for the two years. Tin averaged 30.707 cents; zinc, 5.346 cents and antimony 5.143 cents.

The mines of the Lake Superior iron ore ranges are producing at about two-thirds of their normal rate. The recent fixing of prices for the year has facilitated activities.

Great Britain

The Central Association of Miners' Permanent Relief Societies reports a total membership for 1921 of 356,980. This is a falling off of 17,896 from the membership for 1920. The Societies paid out the sum of £317,041, last year in benefits. Since the year 1879, 1,937,511 non-fatal and 20,437 fatal accidents have been dealt with, representing an outlay of £9,838,276. The fatality rate for the year 1921 was 0.78 per one thousand.

Coal production in Great Britain for the week ended June 3rd was 4,441,000 tons, the previous weeks output being 4,629,000 tons.

Amongst several other Cornish tin mines that are expected to resume production shortly is the Geevor mine. On the completion of a new shaft to the seventh level it is stated that costs can be considerably reduced. This is typical of much new work being carried on with a view to the more efficient operation of the older mines.

The Anglo-Egyptian Oilfields, Limited, with which were consolidated a few years ago, the Red Sea Oilfields, Limited, the Egyptian Oil Trust, Limited, and other concerns, reports a production of 181,000 tons of petroleum for the year 1921 an amount 26,000 tons greater than the production for 1920. The net profit for the year was £374,836 11s. 6d.

A statement issued by the Mining Association of Great Britain shows that, although coal miners' wages are now at, or only slightly above, the stipulated minimum, yet they are in effect 42.97 per cent. above the 1914 level. It had been previously stated that they were but 20 per cent. above.

The Albert Medal of the Royal Society of Arts (1922) has been awarded to Sir Dugald Clerk. The award was made in recognition of Sir Dugald's work in the improvement of the internal combustion engine.

An investigation of the efficiency of domestic cooking stoves as consumers of fuel, conducted by the British Fuel Research Board, shows that the over transmission of heat falls as low as one per cent. The highest recorded efficiency was 17 per cent; the average, 2½ per cent.

In answer to questions asked in Parliament, the Hon. Mr. Bridgman recently stated that during the first five months of the current year the output of coal per man shift, on the seven-hour day, was nearly 20 cwt. This compares favorably with the output for the preceding five months, which was 19 cwt. per man shift, on a working day of eight hours.

Observations of temperatures and the rates of temperature increase in British collieries bring out some interesting facts. At one Yorkshire colliery, at a vertical depth of 2,540 feet, the strata temperature is 91.6° F., the average surface temperature being 48° F. and the "geothermic gradient," therefore, 1° F. in every 58.5 feet. In different collieries this gradient ranges from 36 feet to 106 feet. The normal gradient seems to lie between 56 feet and 70 feet. In a Lancashire colliery the strata temperature at 3,450 feet is 100° F.

Exportation of iron ores and manganese ores from Russia to Germany is now assuming substantial volume.

The French output of steel and pig iron for the quarter ended March 31st was 998,254 tons steel, and 1,914,405 tons pig iron. The Est and Alsace-Lorraine districts produced about 85 per cent. of the steel.

Workers at the Oviedo mines in Spain have absolutely refused to consider any decrease of wages. The strikers are returning to their homes.

To meet the danger of unemployment due to high cost of production, coal mine operators in the Northern France and Pas-de-Calais districts averred recently that reduction in wage rates was essential. No relief had been obtained in the matter of high freight rates, and this made wage reduction all the more imperative.

The continued shortage of coal and coke in Germany is observably affecting the iron and steel output. The situation is rendered more difficult by the temporary transference of labour to necessary summer employments.

For the 12 months ending March 31st, 1922, German production of lignite amounted to 123,000,000 tons, 9.9 per cent. more than for the preceding 12 months. Coal outputs aggregated 136,200,000 tons, an increase of 3.7 per cent. Lignite briquette production totalled 28,300,000 tons, more than half of which came from the Halle district.

Swiss aluminium producers have been almost shut out of the German market. The United States and Great Britain are now Switzerland's largest customers for products of this metal.

During the middle of June, striking iron and steel workers of Bilbao, Spain, to the number of 1,500, resumed work after consenting to a 15 per cent. reduction in wages.

Extensive deposits of gold bearing gravels and sands, on the Orbigo River, Northern Spain, are worked by the Dome Mining Corporation, of London, England. The deposits were known to, and worked by, the Romans. Prospecting shafts and borcholes now indicate, according to the Dome Mining Corporation's reports, 22,758,440 cubic yards of gravel, of a total value of £1,077,000. In addition to this, later prospecting has proven up 5,857,992 cubic yards carrying £244,000.

Africa

The total coal output of the Union of South Africa during 1921 was 13,658,922 tons. Exports amounted to 1,795,093 tons, about half of which went to India, and the bulk of the remainder to Ceylon, Aden, and Egypt. Small shipments were made to Brazil, and the Argentine Republic.

The new State Areas mine property to be worked under lease from the Government, promises to be one the Transvaal's largest producers. The Union of South Africa will get a substantial share of profits from the operating company. Plant construction will be completed early next year. The capacity will be 50,000 tons of ore per month. The ore is to be slimed, and stamps and amalgamation entirely done away with.

The plant of the Geduld mine, Transvaal, is to be enlarged to a capacity of 65,000 tons per month. Estimates of available ore are placed at 6,000,000 tons, averaging 6.6 dwt. per ton, the stoping width being 61 inches.

A United States Geological Mission is visiting South Africa and is on an extended tour of inspection. The members are Professors, Wright, Palache, Daly and Molengraaf, and Mr. L. Hall of the U. S. Geological Survey.

Evidence presented before the South African Industry Board show that whilst 25,701,954 tons of gold ore milled in 1914, at a cost of 17s. 1d. per ton, yielded £21,943,692; in 1921, 23,400,605 tons yielded £30,088,898, but at a cost of 25s. 8d. per ton.

At the settlement of Mosesberg, fifty-odd miles from Kimberley, an alluvial diamond district has been officially proclaimed. A large rush of prospectors occurred when the district was opened.

The district surrounding the village of Amsterdam, Eastern Transvaal, is the scene of gold mining activity. New and interesting developments of the banket strata have been discovered. A syncline, the axis of which passes through Amsterdam, is indicated. The trough is occupied with diabase and similar rocks, underlain in part by sandstone, quartzites and conglomerates. The stratigraphy of the region is well displayed in natural cross-sections.

Evidence taken by the South African Mining Industry Board includes cost statements from five representative gold mines. The plant of the Crown Mines, Limited, has a milling capacity of 225,000 tons per month. During 1921, 13,960 natives and 1,731 whites were employed. The average tonnage milled was 181,400 tons per month. The discrepancy between this and the rated capacity was due to shortage of native labour and to strikes of the whites. The working costs per ton milled were 16s. in 1915 and 25s. in 1921. The ore reserves at the end of 1921 were 8,511,187 tons, averaging 25.62s. The margin of profit is microscopical at present costs. At the Modderfontein East mines the reserves on December 31st, 1921, were 1,880,000 tons averaging 29s. 6d. per ton, and 2,173,000 averaging 28s. 7d. per ton. Here large sums must be expended in construction. At the Durban Roodepoort Deep, working costs have been 33s. 6d. in the past. Ore reserves are 1,092,400 tons averaging 28s. per ton. Only relatively small bodies of ore in this property will pay at the above costs. The Village Deep represents expenditure totalling £2,091,478. The working costs in 1915 were 19s. per ton, in 1921, 29s. 5d. per ton. Working costs here must be brought down to 25s. 8d. per ton. At the Nourse Mines the 1921 costs were 31s. 7d. per ton milled. Here the costs can and should be brought down to 23s. per ton. In all these cases it is urged that ample native labour and freedom from unionized labour control or interference are essential in the future.

Australasia

The management of the Junction North Mine, Broken Hill, has made representations in the Warden's Court to the effect that work cannot be continued at the present wage rates and hours per day worked. The Court consented to recommend a six-months' suspension of regulations governing labour conditions.

During the first quarter of 1922 the production of osmiridum in Tasmania came to 299.09 ounces, valued at £9,410.

Largely on account of the closing of Mount Morgan, the value of Queensland's mineral output for the first quarter of the year was only £36,908, against £122,305 for the first quarter of 121. Silver production 45,817 ounces, marked the only notable increase.

The West Australian output of gold during the month of May was 39,726 ounces, 6,668 ounces less than that of the preceding month.

Tin produced at Mount Bischoff, Tasmania, by recent London assay, is 99.9 per cent pure. Lead 0.05 per cent, is the chief impurity.

Late advices state that the coal miners' union officials of New South Wales have rejected, after joint conference, the owners' proposed wage reduction scheme.

A survey of the iron ore resources of South Australia, made by Mr. R. Lockhart Jack, Deputy Government Geologist, indicates that in the Middleback Range there is ore available to the amount of 165,000,000 tons. The deposits are controlled by the Broken Hill Proprietary Company.

Queensland's output of coal during the year 1921 was 954,763 tons.

British Columbia Letter

Blow-outs at Cassidy

Blow outs have been interfering with the working of the Cassidy, Vancouver Island, mine of the Granby Consolidated Mining & Smelting Co. These occurrences have been more or less frequent for months. Because of them the Minister of Mines some time ago prohibited the use of powder underground. Within the last few weeks they appear to have become more severe, for two miners have lost their lives at different times within this period. In each case they were buried under the fall of coal and life was extinct before the bodies could be extricated. Coroners' juries have returned verdicts of death by misadventure, no blame being attached to any officials. The situation has developed into a problem of some perplexity both for the Department of Mines and the company management. The coal in the area now being worked is soft and conditions are such that there is no assurance that blow-outs will not continue and further lives be lost unless something is done to safeguard the workers. William Sloan, the minister of mines, has interested himself in the matter personally to the extent of prohibiting the use of explosives, taking up with the U. S. Bureau of Mines the question of the explosibility of the mine dust, and now, it is understood, has instructed his officials to make full investigation to the end that effective measures may be adopted.

Coal Miners' "Meet" at Banff

Mine Rescue and First Aid contests were held at Banff Alberta, on June 30 and July 1 under the auspices of the Canadian Institute of Mining & Metallurgy. In the mine rescue event there were thirteen entries, the Fernie team winning first place, taking the championship shield, the Charbonier Cup, individual cups and medals. Their score was 480 out of a possible 500. Others finished as follows: 2nd, Michel; 3rd, Bellevue; 4th, Blairmore, (No. 2); 5th, Gibson Colliery, Drumheller. In the senior first aid contest there were eight entries and the results were: 1, Drumheller Coal & Land Co.; 2, Coleman International; 3, Canmore; 4, Lethbridge. The were seven teams of Boy Scouts in the junior first aid event, and the winners were: 1, Lethbridge (No. 1); 2, Lethbridge (No. 2); 3, Calgary. The ladies First Aid Event was won by a Calgary team. Premier Greenwood, of Alberta presented the awards.

Coal Mines Still Inactive or on Short Time

The British Columbia situation regarding coal production shows little change. In the Crow's Nest Field the mines still are closed owing to the strike. The collieries of the Nicola Princeton area are operating much as usual, although the Coalmont Collieries are doing somewhat better, their output averaging 800 tons a day, which is a considerable jump. On Vancouver Island the Canadian Collieries (D) Ltd. at Comox and Wellington have not yet been required to work full time to meet the demand. The Western Canadian Fuel Corporation, however, is reported to have signed contracts that will absorb its capacity production for a time, consequently the mines at Nanaimo and in that immediate district are active. In the north there is prospecting of the coal fields adjacent to the Grand Trunk Pacific Ry. and it is assured that mines will be operated on a small scale to meet the coal requirements of Prince Rupert and other local centres during the winter.

Shipments of Ochre

Ochrerous clay or impure bog iron ore, an extensive deposit of which exists on Demamel and Stony Creeks, Sooke, Vancouver Island, is being shipped by D. Campbell, owner, to the Seattle Gas Company. The first shipment of 225 tons left Sooke Harbor recently. It is to be used for the purification of gas.

Iron and Gold in Kamloops District

Major A. W. Davis, mining engineer for central British Columbia, states that there is a large amount of magnetite ore near Kamloops and that, cheap water power being available, the possibility of establishing a small plant for the production of pig iron is good. On the west side of Okanagan Lake there has been opened up a fine showing of high-grade gold bearing ore. It is the White Elephant Group, and sixty or seventy dollar ore is being shipped in carload lots. The ore is quartz with pyrrhotite and tellurides occurring in it.

The Portland Canal District

C. A. Mackenzie, owner of the "M.C." near the Premier Mine, Salmon River, passed through Victoria on the 17th July. Development of this property is being carried on this season. He speaks highly of the progress being made in opening up the Portland Canal District by the provincial government by means of necessary road and trail construction. Work of this kind is under way in both the Salmon and Bear River sections.

An air compressor and other plant is being installed on the property of the B. C. Silver Company, Salmon River. Messrs. C. A. Banks and H. L. Batten are supervising the work.

H. Howson has arrived at Stewart en route to the "Big Missouri" Group, recently bonded by A. B. Trites, Fernie, one of the owners of the Premier Mine. Some development work is planned.

George Clothier, government engineer, announces that the Provincial Government proposes construction of a prospectors' trail from near the head of Bear River, skirting the mountain range past Bowser Lake to the head of Unuk River. This will open up approximately 60 miles of virgin mineral bearing territory.

F. N. Cronholm, a Los Angeles Cal. civil engineer, has been looking into the practicability of furnishing an outlet for the production of the Outland Silver Bar Mine, situated on the west side of the Salmon River Glacier about seven miles up. He says that the making of a road on the glacier would be cheap and simple by filling in the cracks and staking out the route. In addition five and a half miles of new wagon road would have to be built on the ground. This would be in American territory, the ice road being on the Canadian side.

Cariboo Placers

Cedar Creek, Cariboo, has not yet proved a fabulously rich placer mining centre. It cannot be said that the excitement has petered out, but the paying ground in that locality has been occupied and returns from owners who are operating are not available. Work on the "discovery" claim has been interfered with by litigation. The Gold Commissioner has order that all leases must be surveyed. There is every probability that hydraulicking or dredging enterprises of considerable size will be initiated in this district.

The exact situation in the Whitewater District where rich discoveries were reported last year, is not known. There has been much staking on Iron and other creeks and large parties of miners and prospectors are in the country. A drill was taken in to explore the "discovery" claim, recorded in the name of Taylor, who took out a quantity of gold last year and a short time ago bonded the property for a substantial sum.

Operations have been resumed at the Rock Creek Mine and Mill of the Consolidated Mining and Smelting Co., situated near Grand Forks.

The Lardeau Valley has been swept by several forest fires this summer, the last destroying the warehouse of the Silver Cup Mining Co. and the buildings of the Big Tunnel Mining Co., both at Five Mile, above the town of Ferguson.

That a contract has been closed by the East Kootenay Power Company with the Consolidated Mining & Smelting Co. to supply power for the Sullivan Mine and the Concentrator being erected there, has been announced. Immediate requirements call for 3,000 horsepower to be delivered at Kimberley, this to be increased within the next ten years to 5,000.

Ore received at the Trail Smelter, Consolidated Mining & Smelting Co., during the first week in July totalled 4,030 tons, of which 74 tons were contributed by the Silversmith Mine, Sandon, the remainder coming from company properties. The aggregate tonnage of ore received for treatment this year so far is given as 226,734.

Some diamond drilling and other development work is being done on the Nickel Plate Mine, Hedley B. C. This mine is in operation again. The 40 stamp mill is working to full capacity and reduces over 200 tons of ore every 24 hours.

Development has been resumed on the Cork Province Mines Ltd., near Kaslo. Operations are in charge of W. Yolen Williams, formerly of the Granby Consolidated Mining & Smelting Co.

Dr. G. A. Young, of the Geological Survey of Canada, has returned to Victoria after an inspection of the hematite deposits at Sand Creek in the Cranbrook District. He has reported that some stripping will be necessary before it is possible to arrive at any sure conclusion as to the commercial possibilities of the property. It is understood that the Provincial Department of Mines has authorized the expenditure required for this purpose. Dr. Young is co-operating with the provincial authorities in the work of ascertaining British Columbia's iron ore resources.

T. E. Pooley, representing Vickers, Son & Co., British steel manufacturers, is in Victoria reporting on iron ore deposits and the economic feasibility of establishing a steel manufacturing plant in this province.

The Atlas Petroleum Co., which is drilling on property held under lease at Hall's Landing, near Revelstoke, Kootenay, has sunk some 160 feet in soft formation. W. E. Marrion, field manager, considers prospects satisfactory and new equipment is being installed to expedite the work.

EXPLORING FOR OIL IN WESTERN CANADA

In the current number of that exceedingly bright and useful monthly *Agriculture and Industrial Progress in Canada*, published by the Canadian Pacific Railway, there appears an article by Mr. A. M. McQueen, vice-president of the Imperial Oil Company.

Mr. McQueen alludes to the fact that the Imperial Oil Company "is making the first comprehensive test of the oil resources of Canada and is, of the world companies, the only one carrying on operations here. Therefore, these operations may be said to be representative of all the conditions existing. But to say this is to belittle neither the courage nor the accomplishments of many small companies which have assisted in the pioneer work, and which will some day participate in the favourable result I confidently believe there will be."

Without deprecating the work of the Geological Survey, Mr. McQueen quite rightly says that one small corner of any one of the four great provinces would have been sufficient to keep the entre survey force busy for a decade.

The reconnaissance undertaken by the geological staff of the Company between 1916 and 1919 covered much virgin territory. Altough geological information was slim and afforded little encouragement, longer chances were taken because of the demands and exigencies of war. Also, Canada produced only two per cent. of the oil she consumed. Beyond these considerations, "the search in the land of the Midnight Sun was not a wild chimera, but the natural evolution of an imperative necessity."

Because other fields are being depleted, oil simply must be found otherwhere. This is the justification for the string of drilling rigs scattered across a territory two thousand miles from the Canadian Boundary to the frozen ocean.

Amongst several possible fields selected, one was chosen near Fort Norman, at a point where oil seeps had been noted by Sir Alexander MacKenzie. By rail and water a rig was shipped over 1500 miles from Edmonton. The derrick was erected and the plant installed late in the autumn of 1919. Another drill was installed at Windy Point on Great slave Lake.

From Peace River Crossing, the end of steel, the route to these northern locations is by water for fifteen hundred miles. The season for navigation lasts for from 100 to 110 days. The Peace River is a placid stream, except for a break at the chutes, where a volume of water a mile and a half wide and a hundred feet deep falls over a fourteen-foot limestone ledge, giving promise of almost immeasurable power for the future. At the second break, down the Slave River, at Smith Rapids there is a sixteen mile haul.

The possibilities of the field can be determined only by drilling. Four drills are now in operation. The expenditure in this district has been and will be very heavy. The Co. recognizes, however, that all that can be accomplished as a result of this heavy expenditure is simply to demonstrate whether or not there exists in that country a reservoir of oil which may become available many years hence, when oil is much scarcer and its price much greater than to-day.

The future establishment of a pipe line to tide water would open up a country two thousand miles long which, together with the oil industry, would sustain a large population and extend the map of Canada north as well as east and west.

Notes From Nova Scotia

THE PICTOU COLLIERIES

The recent depressed condition of the coal trade has been hard on the Pictou colliery districts, the collieries working only two and three days per week. But the miners have borne it bravely, and while many may have been on the verge of suffering, great fortitude has been shown and very little complaint was made. The sturdy, independent spirit of the Pictou people has carried them through the hard times with smiles on their faces, whatever they may have felt within. They will enjoy the prosperity which is about to come to them all the more because they bore their trials in silence. The coal trade is picking up, and August should be for the Acadia collieries a fairly busy month. How much business will fall to the Pictou collieries will largely depend on the amount of coal the Quebec market will absorb and the duration of the coal strike in the United States. But another factor no less important will be the attitude of the men themselves to the Coal Company after the election of officers of the U. M. W. of A.

Pictou Miners are Moderates

If the Pictou miners stand firm against any hasty and ill-advised action of their leaders, as they have done in the past, then they will benefit by it; but should they permit themselves to be carried away by the violence of the Bolshevist party, they will be the losers. While there are a few extremists among them, yet by far the larger number are moderates and have no desire for revolutionary methods. If the McLachlin faction should win at the elections, it will not be by the votes of the Pictou miners. And just how long these men of the Pictou coal field will be willing to adhere to the main body in Cape Breton, will depend entirely on the policy of the leaders and how this policy will be enforced in a district which does not agree with the doctrine that making a company bankrupt is in the best interests of an industry and will eventually lead to the victory of the Proletariat.

Stellarton

One of the growing towns of Pictou County is Stellarton, the headquarters of the Acadia Coal Company. "Stellar" is the name of one of the many seams of the Pictou coal field. When this coal burns, it is covered over with bright little flame stars, and here the town found its name Stellar Town. The town has grown steadily and slowly from the beginning, but with an abundance of coal of fine quality, Stellarton has only begun its career and is yet in the early morning of life. This seems to be well understood by its citizens, many of whom own nice houses surrounded with shade trees, green lawns and beautiful flower and vegetable gardens. The miners' cottages are snug and comfortable looking and are kept just as clean outside as other houses of this well conducted town. There is a little building going on at present, in spite of the depression of the coal and steel trades.

Stellarton seems to be among the best, if not the biggest, of Nova Scotia colliery towns. The population has increased considerably during the last ten years, while coming years will no doubt continue to add to the number as the collieries are developed and enlarged.

The Coal Seams of Pictou

It has long been known that Pictou coal fields contained large bodies of coal. Early geologists had made fairly accurate statements of the number of seams to be found in this field. As far back as 1869, Logan and Hartley's report showed sixteen workable coal seams, but it was not until four or five years ago that the diamond drill proved the correctness of this statement. The following section shows the immense quantity of coal lying in this narrow field, which at present is understood to be eleven miles long by two and one-half wide.

Section of Albion and Allan Shaft Districts

Foord Seam	40 ft. - 0 in.
Strata	150 ft. - 0 in.
Cage Seam	12 ft. - 0 in.
Strata	150 ft. - 9 in.
Third Seam	11 ft. - 0 in.
Strata	180 ft. - 0 in.
McGregor Seam	12 ft. - 0 in.
Strata	50 ft. - 0 in.
Acadia No. 1 Seam	8 ft. - 0 in.
Strata	150 ft. - 0 in.
Norah Seam	8 ft. - 0 in.
Strata	250 ft. - 0 in.
No. 5 Seam	28 ft. - 6 in.
Strata	50 ft. - 0 in.
No. 6 Seam	4 ft - 11 in.
Strata	60 ft. - 0 in.
No. 7 Seam	20 ft. - 4 in.
Strata	100 ft. - 0 in.
No. 10 Seam	24 ft. - 2 in.
Strata	50 ft. - 0 in.
No. 11 Seam	23 ft. - 0 in.
(Distance unknown — not correlated)	
Old Acadia or Main Seam	14 ft. - 6 in.
Strata	200 ft. - 0 in.
Scott Pit Seam	8 ft. - 0 in.

NOTE — Probable depth at Allan Shaft from surface to old Acadia or Main Seam — 3,500 ft.

Section of Thorburn District

Captain Seam	3 ft - 0 in.
Strata	57 ft. - 0 in.
Millrace Seam	3 ft - 0 in.
Strata	62 ft - 0 in.
McKay Seam	3 ft - 0 in.
Strata	590 ft - 0 in.
Six Foot Seam	4 ft - 6 in.
Strata	750 ft - 0 in.
McBean Seam	6 ft - 0 in.

At first glance it might be thought that this field should be a large producer, and the output could indeed be very much enlarged. But the position of the coal seams, overlying one another with, in some cases, only thin strata between, does not lend itself to great output — that is if conservation of coal is to be observed. The seams cannot all be developed at the same time, but by careful mining methods they can be made to give much larger outputs than they are at present doing. Owing to the thickness of the seams and the amount of gas given off, they have been found difficult to operate; but as mining science has developed and men have gained experience, these difficulties are being overcome and a feeling of security established.

A Forty-Foot Coal Seam

The Allen Shafts are down on the Foord Seam which is forty feet thick. To the outside public a forty-foot seam of coal sounds good, but to mining men it presents difficult problems. The seam is too thick to be easily mined and all coal extracted. If it was broken up into four separate seams of ten feet it would be better. Five seams each eight feet thick would be ideal. Coal left in the waste workings means mine fires, for sooner or later broken or pulverized coal heats and takes fire. Under the most favorable conditions, fire in a coal mine is a terrible thing; but when large quantities of mine gas are given off, danger and disaster hover over the mine and over the workmen who risk their lives to fight it. Experience has taught that mine fires, when they cannot be controlled in the early stages, must be immediately walled off by stone or thick concrete stoppings.

The present method of mining in the Foord seam is to extract the lower part first, taking out about eight feet of the coal. The upper part is dropped in lifts until the height of twenty feet is reached. The bord is then widened and the upper layers of coal, being weakened, fall down and in many cases there is now comparatively little coal lost. The pillars are then extracted. The roof is tender and when broken runs like beans out of a hole in a bag. The panel system is used so that, should a fire break out or that section be worked out, it can be walled off, thus securing the safety of other parts of the mine. Experiments are being made in driving double bords, the one directly over the other, with the top bord advanced about forty feet. With a bord below and one in the upper layer of the seam there is still over twenty feet of coal to break down. The mine officials seem to agree that in time this method will be perfected, when a still larger percentage of coal may be won. One of the difficulties of the new method is the matter of ventilation; but this is being overcome. The advantage would be large outputs from small sections, a larger percentage of coal won, and the danger of mine fires greatly lessened.

The Albion seam is fifteen feet thick and while much thinner than the Foord, for all practical purposes it is far too thick.

The Recent Re-organization.

The Acadia Coal Company is now part of the Empire Steel Corporation. A re-organization of the management took place shortly after the Corporation took charge, and a strong and capable staff of mine officials was placed in charge. The 1918 explosion had destroyed a large part of the mine and new ground had to be attacked. This caused development work to fall behind; but the management, in spite of labour and other difficulties, persevered and are in a position today to give a good output. New sections were opened up and older ones further developed, and should a brisk season set in, the Acadia collieries will give a good account of themselves. The mine officials speak with a confidence which means much for the future welfare of the coal industry in Pictou County. They know what they have already accomplished and they believe that much more can be done. Expert mining skill and experience is being applied to discover the method of mining best suited to the coal seams, while the safety of the workmen is the first thought of all the officials. They are full of optimism and believe in themselves, their workmen and their collieries; and with all pulling together, they look for better things to come.

The manager, A. McColl, is a Pictou man, brought up in the business of coal and steel, and he knows it thoroughly. He has a University education, and added to this a long experience with the Nova Scotia Steel and Coal Company that eminently fits him for his present position as General Manager.

Asst.-Manager J. J. MacDougall has steadily climbed up from one position to another in the Cape Breton collieries. For five years he was General Superintendent at Wabana, which position he filled with ability and success. He is still a young man and while he may be overshadowed by his more brilliant brother, Vice-President D. H. MacDougall of Empire Steel fame, his genial personality, his love of a square deal to workmen, and his habit of steady working and stick-to-itiveness will carry him further along the road to success.

District Superintendent M. Blue rose from the ranks and is a remarkable man. He was one of the first miners to take advantage of the mining school. He has managed successfully different collieries in Springhill. He was appointed Deputy Inspector of mines, which position he held for two years, until he gave it up to take charge of the Drummond colliery, Westville. After thirteen successful years he went to Springhill as District Superintendent and is now back in Pictou again, being General Superintendent of the Acadia and Springhill collieries. J. B. McLachlan, in his evidence before the Conciliation Board, stated that "Government Inspectors were either old cast-off Managers of fifth-rate men"; but here is a man who has shown marked ability in all his work and gives the lie straight to "Jimmy"; and he is not the only one.

Mining Engineer T. L. McCall is a young Scot with a good training and a unique and successful experience in the mines of Malaya, where he opened and developed a colliery under conditions calculated to discourage the average man. He loves work, and golf, and if when enjoying these he remembers the Sabbath day, he will come through alright.

Drummond Colliery

Drummond colliery, Westville, three miles from Stellarton, is on broken time. Manager Maxwell hopes for a share of trade shortly. The miners of Westville are moderate in tone, although the miners' local appointed a man to oppose President Baxter. Mr. Maxwell is proud of his native town and speaks well of his workmen; and if at present Pictou County has no reason to boast of the prosperity of its coal trade, yet the whole Province feels proud that its product is not confined to coal alone, for Harvard University at the last examinations bestowed high honours on two of Mr. Maxwell's sons. This old Province by the sea is keeping up its reputation for the making of men, and Pictou County has had a large share in the making.

The steel trade is improving and shipments of iron ore from Wabana to Sydney will begin shortly. The working force at Wabana is double that of last winter and will be increased as shipping becomes more active.

Develpment work in the iron ore mines proceeds regularly, and large sections are opened ahead to meet any special demand that may be made.

Northern Ontario Letter

A Record for Dome

According to direct official advice to the representative of the Journal, the Dome Mines produced $351,531 during the month of June, thereby setting the second highest record for any one month so far in the history of the mine. The mill handled 1,036 tons of ore every twenty four hours, or an aggregate of 31,991 tons for thirty days. The grade of the ore averaged about $11.25 a ton and resulted in a recovery of $10.98 from each ton of ore treated.

For the first six months of the current year, the output has reached a total of $1,973,000. This production, along with income from interest on bonds and investments brings the income of the Dome to well over $2,000,000 for the half year.

P. N. T. Reorganization

The situation with regard to the proposed re organization of the Porcupine V. N. T. Mines is this:—At a meeting to be held next Saturday in Toronto, the shareholders will be asked to ratify a deal whereby a new company will be formed, having an authorized capital of 2,000,000. The plan is to allot 1,000,000 shares in *full payment* for the Porcupine V. N. T. The other 1,000,000 are to be treasury shares and are to be sold or optioned at 40 cents each with the intention of thereby netting the company treasury the sum of $400,000. Estimating the value of the shares allotted to the Porcupine V. N. T. to be worth 40 cents each, it does not follow that a valuation of $800,000 is placed on the mine. The fact is that it does show a valuation of $800,000 on the mine *plus* $400,000 in cash. By the time this $400,000 is all spent on the mine it will be correct to say that a valuation of $800,000 has been placed on the mine. It remains to be seen whether that value is reasonable, or not.

As to this, the property lies directly adjacent to the Porcupine Crown and Hollinger Consolidated. In fact some of the Hollinger workings are within a few feet of the boundary of the Porcupine V. N. T. Not only this, but the property is equipped with a first class mining plant which is good for carrying work to a depth of at least 1,000 feet, and with a mill which will handle 150 tons daily by making certain alterations which will cost between $40,000 and $50,000. Also, the mine has already been opened up to a depth of 775 feet, with good ore in sight at the 600 ft. level. The objective of the present work is to open up levels at 750 feet and 900 feet deep. Between the present point of operations and the boundary line of the Hollinger Consolidated are several hundred feet of ground in which a number of veins are in evidence on surface and in which gold is visible. These veins may be regarded as possible sources of ore as they are actually in that elevation which is commonly known as "Hollinger Hill", which is showing every indication of being one of the the richest pieces of gold bearing ground in the world. It was only a few days ago that A. F. Brigham, general manager of the Hollinger Consolidated, made the public declaration that for every twelve inches in depth in that part of the mine so far developed the Hollinger was assured of an output of at least $150,000. That is to say at least $150,000,000 for every 1000 feet in depth. It follows that if the deposits extend to a maximum depth of 6000 feet that a total of close to a billion dollars would be mined from the Hollinger.

It is in the belief that the Porcupine V. N. T. property will share at least some of the favorable results that are occurring on its big neighbor, that those interested in the Porcupine V. N. T. are looking to the future with optimism. A valuation of $400,000 on the mine, including a large amount of pioneer work already done, plus mining plant and mill may be regarded as possibly the lowest valuation ever placed on such a mining property. The provision of an additional $400,000 as a means of putting the mine on its feet in a big way may be regarded as the surest road to success.

The chief objection heard against the latest scheme is the terms of an option which gives Mr. Moysey a grip on the treasury and in reality makes the Hamilton B. Wills firm the clearing house for a large amount of treasury stock.

Exploration on Night Hawk Lake

According to reports reaching here from the Night Hawk Lake district, a good discovery has been made on the McLeod property, lying adjacent to the Night Hawk Peninsula property.

A syndicate of local business men acquired an option some months ago on the McLeod property and commenced exploration work recently with a diamond drill. The first hole is down 600 feet, or a vertical depth of about 400 feet, at which point a promising vein has been intersected. No statement of the gold content of the vein has been given out, but the values said to be "entirely satisfactory." A feature of the find is that the vein is believed to be a continuation of the main vein of the adjoining Night Hawk Peninsula property where outstanding success has been met with during the past year.

Shipment of Ore from Blue Quartz

Arrangements are being made to send a shipment of high grade ore from the Blue Quartz Gold Mines to Cobalt. This consignment will go forward before the end of July. Careful sampling shows an average gold content of about $394. per ton in gold and 9.7 ounces of silver per ton. This ore has been selected during the course of recent development work.

The shaft on the property is now down 200 feet and good progress is being made, the lateral work at the 100 ft. level amounting to close to 600 feet. A station is being cut at the 200 ft. level preparatory to extending lateral operations at this horizon. A number of veins were cut at the 100 ft. level.

A force of 30 men are now engaged, and three shifts with two drills are being worked. The plan consist of a 5 drill compressor, 80 h.p. and 60 h.p. boilers, together with corresponding equipment.

The Blue Quartz Gold mines is a company which has been promoted by Toronto and English interests. The Company took over mining claims from Cartwright Gold fields and La Santa Lucia. A total of eleven veins have been uncovered on surface.

Arrangements are being made for a group of those interested to leave Toronto August 4th for the purpose of visiting the mine. H. C. Crow of Toronto is president and C. H. Taylor, also of Toronto, is vice-president of the Company. J. J. Hollinger is in charge of operations.

Second Tough-Oakes Clean up

Although no official statement has been issued it is learned that the second gold brick from the Tough Oakes mill was somewhat smaller than the first. The first clean up, made about the end of June after six weeks run, is

sulted in a production of about $19,000. The second clean-up made recently is said to have amounted to approximately $12,000.

Shaft-Sinking on King Kirkland

Sinking operations are progressing at a rate of from four to five feet daily on the King Kirkland Gold Mines. The shaft is now down about 170 feet, the plan being to cut a station at a depth of 300 feet and then continue to the 500-ft. level.

The indications appear to be that a slight dip will carry the vein out of the shaft, but only a few feet of cross-cutting will be required at the 300 and 500-ft. levels to open it up. There are also a number of parallel veins to which lateral operations will be carried as soon as sinking is complete and drifting under way on the main vein.

Good ore is showing on the King Kirkland at the 100-ft. level, and the operators of the mine are looking forward optimistically to the result of the deep mining now under way.

Optimistic View of Northern Manitoba

R. B. Watson, general Manager of the Nipissing Mining Company, is hopeful of payable ore-deposits being found in Northern Manitoba. This result may or may not be secured on properties already staked out; but, by persistent, aggressive and intelligent effort on the part of prospectors, miners and the government, it is reasonable to believe that a good reward lies in store for Northern Manitoba in the form of a substantial mining industry.

This is the gist of the views secured by the Journal during the course of an interview with Mr. Watson. To those who are acquainted with the ultra-conservative views of Mr. Watson, the optimistic reference to the possibilities of Northern Manitoba will leave the impression that although Northern Ontario is one of the greatest new mining fields in the world, yet there may come a time when Northern Manitoba will claim an important place at Ontario's side as a mineral producer.

Nipissing's Option on Elbow Lake Property

At the time of writing, the Nipissing still holds its option on the Gordon property in the Elbow Lake district of Northern Manitoba. Recent reports had it that the option had been dropped, but it has been learned officially that the ultimate outcome is still uncertain.

"It would be wrong to say that the option is being dropped," stated an official, "as one never knows what may happen at the last moment". In other words, although the result of work has been encouraging but not sufficiently so to warrant taking up the property, yet the geological structure and the nature of the mineral occurrence are such as to hold out possibilities of favorable results from additional exploration work now under way.

Debts of Montreal-Ontario Being Paid

The affairs of the Montreal-Ontario are gradually taking definite form. Of the debts of about $125,000 against the old Ontario-Kirkland, the new company has retired over fifty per cent. An extension of time has been secured on certain of the accounts, and the indications appear to be that the whole situation will be adjusted by the first half of the coming year.

In the meantime a limited amount of underground work is being done, and it is understood that no enlargement of operations is being considered for the present.

Voluntary Assistance for Road to Matachewan

A movement is on foot among mining men, prospectors and business men to encourage sufficient public spirit to have men volunteer services for a short time in cutting a road through the townships of Eby, Burt, etc., to the Fort Matachewan gold area. It is believed that if such a road could be cut, it would be only a matter of time until government assistance could be secured in making it suitable for general traffic.

The rock formations in the mineralized area of Kirkland Lake are very similar to the occurrence in the Fort Matachewan district. This has led some mining men to believe that the intervening country may be found to have deposits of value. At any rate, the proposed road upon which attention is now being centred would follow the general course of such a mineralized area.

Prospecting for Silver in Bucke Twp.

There is a possibility of the mineralized area of Cobalt being broader than has generally been supposed. There are fair possibilities of the south-eastern part of the township of Bucke turning out to be a profitable mining area.

Some months ago the Coniagas company secured a working option on the Ruby Silver Mines in south-eastern Bucke. Diamond drilling operations were commenced with a view to determining whether the conglomerate formation was merely a shell, or of substantial thickness. The result has been that the conglomerate has a known thickness of some 250 feet — actually more than the average thickness in the producing part of the Cobalt field.

As is well known to mining men, the conglomerate formation overlying diabase and Keewatin rocks has been the source of nearly ninety per cent. of the silver produced from the Cobalt mines. Over a quarter of a billion ounces of silver have been mined during the past eighteen years from veins which occur in the conglomerate formation.

This favorable geological structure on the Ruby Silver Mines does not assure success, but it does comprise sufficient encouragement to carry on aggressive exploration work. It is understood therefore, that the Coniagas will follow up this encouraging result with actual mining operations with a view to exploring known veins at points where they occur in the conglomerate in close proximity to the formation lying beneath. This will comprise one of the most interesting pieces of exploration work ever undertaken in the areas lying adjacent to the highly productive Cobalt field.

South-eastern Bucke is along the T. & N. O. Railway right at the town of North Cobalt and actually within sight of Lake Temiskaming and the town of Haileybury. Mining success of importance here would be of extreme importance to these towns, as well as to Cobalt.

During the past week the Mining Corporation and La Rose mines both shipped ore over the T. & N. O. Railway. The Mining Corporation sent out two cars containing 173,897 pounds, while La Rose sent out one car containing 65,319.

Advertisements other than "Employment Wanted" or "Employees Wanted" will be inserted in this department at the rate of 20 cents per agate line (14 agate lines make one inch). $2.80 per inch, each insertion, payable in advance. Space measured from rule to rule. When four or more consecutive insertions of the same advertisement are ordered a discount of 25 per cent. will be allowed.

Advertisements of "Wanted Employment" or "Wanted Employees" will be inserted at the rate of two cents a word, net. Cash must accompany order. If box number is used, enclose ten cents extra for postage in forwarding replies. Minimum charge 50 cents.

EMPLOYMENT WANTED — Connection desired with a strong company requiring the services of a trustworthy, competent scout or examiner. Excellent references, thorough technical training and long experience. Apply Box 501, Canadian Mining Journal, Gardenvale, Que.

EDITORIAL

The mining men of Canada . . . have a great mineral field before them—half a continent. We are scarcely at the beginning. Let us make the best of our opportunities. Let us . . . have faith in Canada and in ourselves and a firm belief in the future of our industry.—W. G. Miller—1909.

OUR FUEL SUPPLY

It has long been recognized by well informed Canadians that our country has a fuel problem of first rate dimensions. The problem in Nova Scotia is mainly one of methods of mining, as the larger part of the coal seams are under the sea. In British Columbia and Alberta the capacity of the coal measures, and indeed of the coal mines, is far beyond any present normal demand. Saskatchewan and Manitoba have only inferior coal, whereas Ontario and Quebec have none.

It has required the heroic measure of a great coal strike throughout the United States to force on the notice of the generality of Canadians in Ontario and Quebec their present utter dependence upon imported coal. Even then the imminence of a serious coal shortage was not even deemed worthy of general public attention until Mr. S. J. Cook of the Dominion Bureau of Statistics issued his statement a few weeks ago. This statement was well timed, and eminently courageous. Its issuance at a psychological moment has had a decidedly salutary effect. It has awakened the public, as well as governmental authorities, from their usual deep sleep, induced by that potent soporific, Ignorance.

It is interesting to note the various shades of opinion induced by public spirit, on the one hand, and self interest on the other. Mr. Cook, with all the information available to a specialist, and in constant touch with the highest authorities both here and in the United States, says that we are facing a serious fuel shortage; coal dealers in numerous centres assert that Mr. Cook does not know what he is talking about, and that, as they have got their coal from Pennsylvania during October and November for years past, so they will get it this year, assuming the strike to be settled by that time. We observe this shilly-shally even in our cabinet in Ottawa, if news despatches be authentic. Our federal ministers, lacking the courage of Mr. Cook, fear to offend the coal dealers and our own coal miners, and hope (in spite of warnings from Mr. Hoover in Washington) that the meagre supply available on the cessation of the strike—when it ends—will be shared with Canada. This is a fine, independent attitude for the chief executives of our Dominion! How proud we feel of the character and decision of our chosen leaders in this time of need!"

A bright spot in this dark picture is the success, to date, of the attempt to make peat fuel available in Central Canada. Only a small fraction of the peat bogs of this area have been surveyed and tested, but by this means 110 million tons of potential fuel has been disclosed in Ontario, and 70 millions in Quebec. To-day we report the progress of the experimental work of the Joint Peat Committee at Alfred, Ontario. Should the experiment prove completely successful it will solve to a notable extent the fuel problem of these central provinces.

Meantime we have in Nova Scotia a recurrence of the threat to strike. In obedience to an order from the United States, Mr. Robert Baxter, leader of the moderate and saner element among the miners, has spoken for a strike, unless 1921 wages are restored. As it is utterly impossible, as well as unreasonable, that wages should be continued at the rates prevalent at the peak of the "boom", the continued production of coal in Nova Scotia is very doubtful. If the Nova Scotian miner is wise, he will refrain from "cutting off his nose to spite his face." Probably his range of vision is too short to see the unusual benefit the coal miner on Vancouver Island is just now deriving from sticking to his work.

Whatever the immediate outcome of these senseless strikes, the ultimate result will be an enormous loss of material wealth to the miner and to the world, and a hard learned lesson to all concerned. The more clearly the general public is forced to realize both the price it has to pay for these disruptions of social order, and its responsibility for their settlement, the larger will be the meagre result of good from this great evil.

CANADIAN FIELDS FOR PROSPECTORS

There has been a good deal of public discussion during recent months in the United States as to whether the day of the prospector is over. The voice of the prospector himself has been almost inaudible in these discussions, as befits one who is near his last gasp. The consensus of opinion seems to be that the mineral deposits within the bounds of the United States still undiscovered, that can be located by the means available to the prospector are so few and far between that his search will, in general, be

fruitless. It has not yet been definitely disclosed wherein the future hope of the mineral industry of the United States lies; but "intensive exploration" seems to be the main recourse of our neighbours.

Fortunately for us, Canada is not in the same case as the United States. We have still on our most recent maps innumerable blank, white patches, significant as showing that nothing is known of the vast territories they represent. Only this week we have a newspaper despatch from Edmonton wherein are recounted the wonders of a valley, two hundred miles long, between the Liard and Fort Nelson rivers in northeastern British Columbia. Whether the prospector's story of what he has found there be true or not — hot springs, moose as fat as prize cattle, semi-tropical vegetation, and all manner of precious metals — the fact remains that there are in Canada plenty of valleys of this size, and innumerable smaller areas that have never yet been trodden by the white man, or where the only traverses are those made by explorers or trappers, whose meagre record is a line on the map, or a hint of geological horizons.

Thus we will require for decades to come the services of the hardy pioneer who fifty years ago was responsible for the initial development not only of the western United States, but of our own British Columbia. This man must be hardy, and imbued with the pioneer spirit; but we do not suggest that he has not advanced with advancing time. It would be lamentable if the mental equipment of the present-day prospector were not superior to that of the 'forty-niner; his physical equipment remains substantially the same, minus the load of whiskers.

The prospector is still the prime factor in the mineral development of Canada, and will remain so for at least a full generation. It is true that within the fringe of our territory that at present contains the bulk of our mines, the discovery of new mineral deposits is becoming increasingly difficult; but even here, the "new learning" gained by prospectors in recent years has brought to light many deposits heretofore effectively concealed. The prospector's increasing knowledge will extend, to a degree realized by few, his power to discover nature's secrets. Here, as elsewhere, knowledge is power.

In this connection it is interesting to note that it is only recently that the idea of technically trained mining engineers has been generally accepted. As late as 1907 there was a heated discussion at the annual meeting of the Canadian Mining Institute as to whether the technically trained or the self-trained miner could best fill a responsible position in the industry. Time has proved the point beyond peradventure. Similarly, we are confident, will the prospector benefit from the knowledge accumulated by his own predecessors as well as by geologists and the whole range of explorers in science. We must put this tool in his hands as quickly as possible, that his efforts may be still more effective.

THE NEW STUDY OF COAL

Modern methods in the study of chemistry and paleobotany of coal are so radically changed from the methods established by custom and convention that they constitute a practically new branch of science.

With the aid of the microscope and Canada balsam, the four prime constitutents of coal have been isolated, differentiated, and identified. They have also been named. It is a good sign of the spirit of the times that their names "fusian," "durain," "clarain," and "vitrain," are si sort, significant, and mnemonic.

A brilliant exponent of the new study of coal is an Englishwoman, Dr. Marie Carmichael Stopes. In this issue of the *Canadian Mining Journal* we publish an abstract of a lecture delivered by Dr. Stopes at Sheffield University, England. It will be noticed that Dr. Stopes' utterances are not lacking in positiveness. Here is no shrinking violet, no meek disciple, but a challenging personality. Dr. Stopes believes that "the chemist's knowledge of coal at the present moment is that of the Dark Ages, as mediaeval in its erudity and misleading in its apparent exactitude of percentage as was pre-atomic inorganic chemistry." She maintains that knowledge of the microscopic structure and chemical properties of the newly-identified substances that together constitute coal will soon be recognized as equal in importance to a knowledge of petrography and of Metallography in the allied sciences of geology and metallurgy.

Dr. Stopes' definition of coal as "a compact, stratified mass of dismembered 'mummified' plants" is neither elegant nor final; but it is a step in the right direction. Her flouting of the current idea that a special form of flora in the "Coal Measure epochs" was necessary to the formation of coal, is convincing. Three of the names of the integrals of coal were coined by Dr. Stopes, who has made herself not only an acknowledged authority on this phase of paleobotany, but is in demand as a forceful and remarkably lucid lecturer.

What St. Paul would feel or say were he to visit this vale of tears and see women achieving leadership, would probably not be in keeping with apostolic tradition..

For ourselves we welcome the opportunity of paying our respects to a woman scientist whose temerity is exceeded only by her positive accomplishments.

THE LATE J. D. SHARPE

On Tuesday, July 25th, John Dodds Sharpe died at his home in Thetford Mines, Quebec. He had been ill for almost a year, and his friends and family have known for some time that the end was near. He put up a good fight for life, as befitted one of his vigour and determination, and was rewarded by a peaceful end.

Mr. Sharpe was one of the few men principally responsible for the creation of the Quebec asbestos industry as it is today. As head of the Asbestos Corporation of

Canada for a decade, he controlled the policy and operation of the largest single factor in the industry. To him, more than to any other man, is due the forward position of the company whose operations he directed.

To his friends and acquaintances Mr. Sharpe was known as a man of great personal charm, and possessed of those qualities that produce what we call "big" men. His outstanding executive abilities made him notable throughout the asbestos district, and indeed throughout a much wider circle. To his lieutenants he was known as a man who trusted them with the utmost confidence, once they had earned his faith. His character was impressed upon his whole organization.

Mr. Sharpe was born in Philadelphia 55 years ago. He had the advantage of a thorough technical education, and was a seasoned miner before he came to Canada, most of his experience having been gained in the Pennsylvania coal fields and in Mexico. Once in Canada, he became a whole-hearted Canadian, and always advised others in like case to do the same.

Material monuments to Mr. Sharpe's ability are plain to see in the asbestos district. The huge storage bins of unique design; the tremendous ore-reserves, developed so simply and effectively at several of the pits; the complete electrification of two of the mines, — these are typical of a man with a firm grasp of affairs, both technical and financial.

On the day of the funeral service at Thetford, the workmen of the properties in Black Lake marched "en masse" to the neighbouring town to attend the ceremony. The burial was at Sherbrooke, where a service attended by a very large number of friends and acquaintances marked the regard in which Mr. Sharpe was held. Mr Sharpe has left a widow and six children, to whom we offer our sympathy.

EDITORIAL NOTES

To day we review, on another page, Dr. H. C. Cooke's report on the geology of the Larder Lake area. This report is not concerned particularly with the economic features of the area involved, the main object of the survey having been to study the geological features and so to provide the key to an understanding of the whole district's gold occurrences. But Dr. Cooke epitomises the insuperable difficulties under which the pioneers of the Larder Lake district strove when he states that the gold "was deposited as native gold in minute fractures in the "quartz veins that cut the dolomite bodies," and that "absolutely no connection exists between the concentra- "tion of pyrite, the only sulphide in the rock, and its gold "content." It is evidence of this sort that has led the *Canadian Mining Journal* to endorse the recent unqualified condemnation of the squandering of money, obtained from the public, by the Canadian Associated Goldfields of Larder Lake, whose operations have been based upon the erroneous assumption that payable gold values exist in the dolomite, apart from the occasional minute fractures described by Dr. Cooke.

Dr. Cooke's memoir brings to mind two other points that have been noticed in these columns. His present field of investigation is Northern Quebec, in a region where he precedes the prospector in large measure, and where he hopes to make available to the searcher for gold definite information for his guidance. The Dominion Geological Survey heeds no interprovincial boundary, and will make available in Northern Quebec the fruit of four years of geological research in Northern Ontario.

The decision to train specialists within the ranks of the Geological Survey is the second point, exemplified by the fact that, since he studied the Matachewan gold area in the summer of 1918, Dr. Cooke has been studying continuously the gold fields of our northern pre-Cambrian area. It may seem a small thing that a single geologist of first-rate ability is applying his energies thus consistently; but it is principally as the result of such concentrated effort that our geological and economic problems are solved. We are well satisfied that this idea of training and employing specialists, particularly specialists in geology, is rapidly gaining ground among those interested in our mineral resources.

The coal problem of Central Canada is commencing, at last, to attract general public notice. Our present utter dependence, in this central part, upon the coal fields of our neighbour is at last obvious to the most obtuse. Consequently there is now some hope that the solution of the problem may receive the attention it deserves. Similarly, it might be a very good thing for Canada if the outside supply of iron ore upon which we now so completely depend were to be cut off for, say, a year. No argument is so convincing as necessity.

HOT AIR HISTORICALLY CONSIDERED

King David knew his brother man
About as well as mortal can
He hated, loved, and sinned a bit;
And yet was godly and a wit.
He had no patience with the fool;
His way with him was sharp and cool.
As warning to all careless buyers,
He stated flat: "All men are liars!"
We'd hardly go as far as that,
For in the fire would fall the fat;
But let us here affirm that those
Whose confidence and trust repose
In hot air artists and their gaff
Deserve to lose their hard earned stuff

L'Envoi

If illustration you requiah,
Why, pause and think of poor Uriah!

ANON

The Anrep-Moore Machine Peat Manufacturing Plant

A DESCRIPTION OF THE PLANT DEVELOPED BY THE JOINT PEAT COMMITTEE AT ALFRED, ONTARIO, AND OF ITS OPERATION

The final experimental work of the Joint Peat Committee at Alfred, Ontario, is now in progress. A visit to the scene of operations to-day is highly instructive, and gives tangible evidence of the thoroughness and consistency with which the work of this Committee has been carried on during the last four seasons. As the experimental research now gives definite evidence of a successful issue, and as the advent of peat fuel will be so highly important to coal-less Central Canada, a description of the means by which this end will be accomplished is at this time decidedly in order.

The Problem

An un-drained peat bog contains about 95 per cent. water and five per cent. carbonaceous fuel. By ditching in an approved fashion, the proportion of solids can be raised to 12½ or 15 per cent., which is about the same as the solid constituents of milk. Thus the problem that the Joint Peat Committee has tackled with such confidence, and now with such good prospect of success, is to convert this quaking bog into a fuel for our cook-stoves, fire-places and steam boilers at a cost such that it can compete successfully with imported coal.

The reason that raw peat, with no greater a proportion of solids in its make-up than milk, is of a semi-solid nature, is, of course, that its structure is cellular. The plants, mostly mosses, whose remains compose the bog have combined sunlight, air and water to build up a myriad of little cells, each of which is now full of water. The interstices are also filled with water until the bog is drained; but it is not possible to lower the water content to less than 85 to 87½ per cent. by this means.

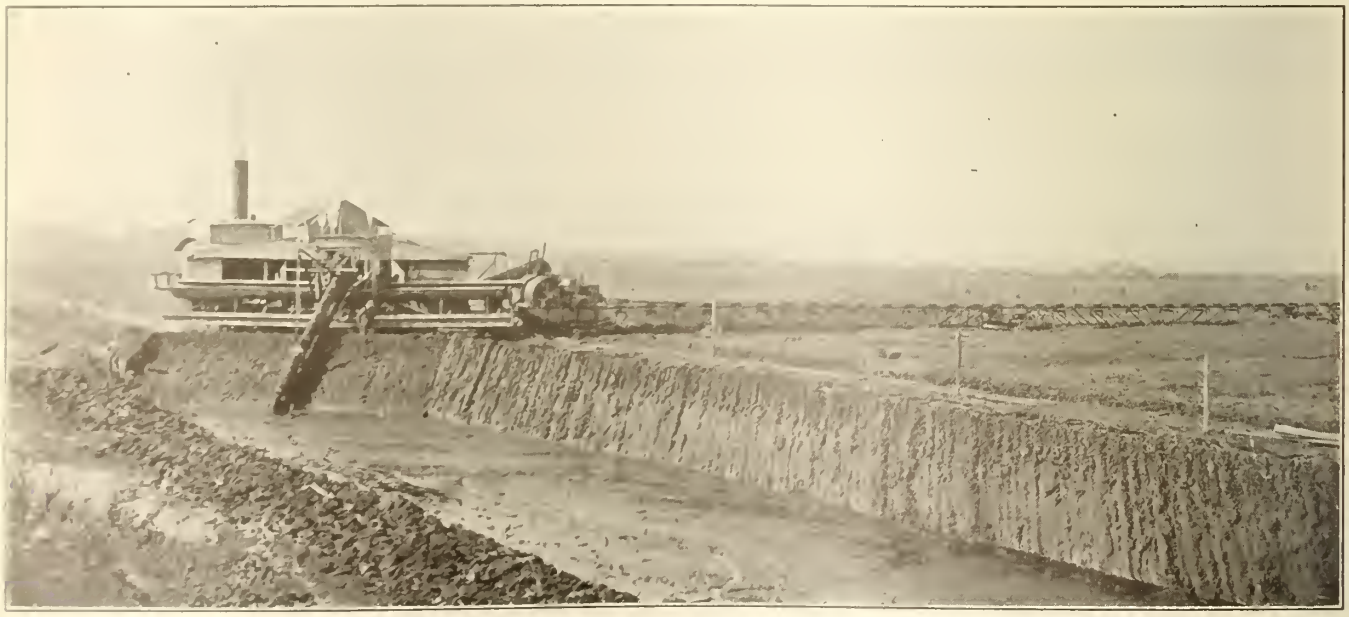
Many have been the attempts to remove the water from raw peat by squeezing or crushing it, or by artificial evaporation, followed by briquetting. A number of such processes have been devised that turn out good fuel; but invariably they have failed of commercial success, for the good and sufficient reason that more energy is consumed in the operation of producing the fuel by this means than is contained in it when finished. Thus the solution of the problem rests upon the use of energy that costs nothing—and plenty such energy is to be had from the sun.

Realizing that sun-power, free of cost, must be the principal agent in manufacturing the fuel, the problem is how to make use of this free power. This problem the Peat Committee have now solved. Their engineers have devised mechanisms that dig out the raw peat, break down the cell-walls in order that the peat pulp may condense when drying, and then spread the resulting pulp over the surface of the bog and cut it into blocks. After the sun has got in his good work, the blocks of peat are harvested by the aid of a separate "harvester" and stored in a stock-pile ready for loading into railway cars. These operations will be described consecutively after a general description of the whole scheme of operations has been given.

Plan of Operation

The general plan of operation is illustrated in the accompanying figure. The peat, which may vary from six feet up to, say, twelve or fifteen feet in depth, is dug in long strips in succession along one side and then the other of the excavation illustrated. The strip is 29 feet wide and nearly 1000 yards long, as is convenient. The "digger" moves backwards and forwards diagonally along a working face, dragging up the peat into the machine. The raw peat, a semi-fluid mass, is carried in screw conveyors to the "macerater", a hammer-mill revolving at about 1400 r.p.m., where the cell-walls are effectively broken down. This is the beginning and the end of the process of mechanical treatment, all the remaining steps being merely the conveyance of the material hither and thither.

The macerated pulp, now semi-fluid, is discharged by a screw conveyor to a belt conveyor 850 feet in length,



Anrep-Moore Peat Machine, showing Excavator, with Digger working on diagonal face, and part of Belt Conveyor.

beside which moves the "spreader." This spreader removes the pulp from the belt, spreads it evenly in a layer, 5 inches thick, on the surface of the bog, and marks it into blocks of convenient size. The sun does the rest. When the upper side is sufficiently dried, the blocks are turned over by hand with rakes. When the spreader has completed one row, 12 feet wide, conveyor and spreader both move forward to give room for the next row. These two pieces of machinery move independently of the main machine that excavates and macerates.

When the end of the cut on one side of the excavation is reached, the excavator and spreader are moved on their caterpillars to the opposite side, while the 850 foot conveyor, is moved bodily to its new position on the permanent narrow-gauge track that runs along both ends of the drying field. The whole machine now returns on its second cut, on drying field number two, which it likewise covers with its blocks of fuel.

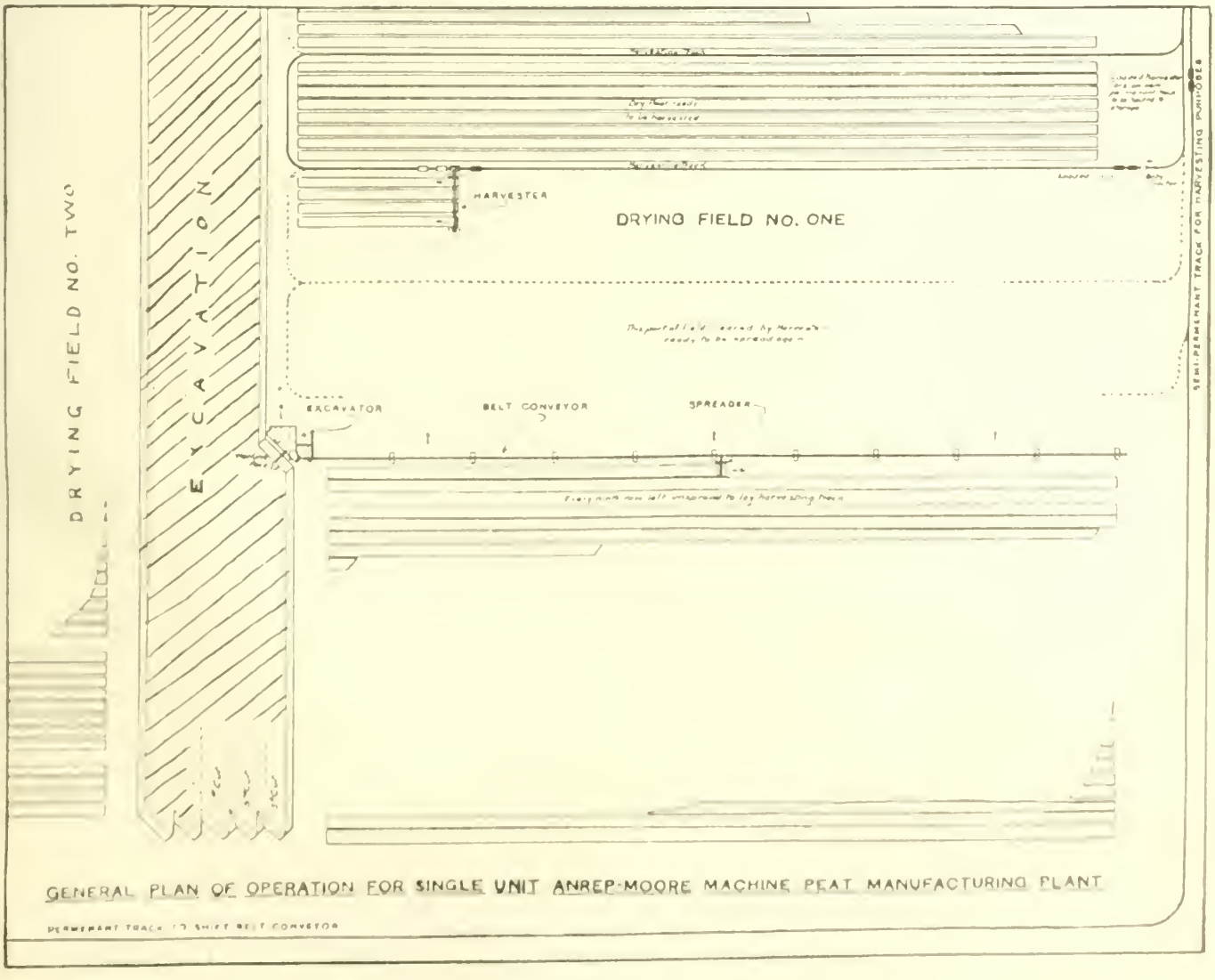
The length of the excavation is so arranged that by the time the peat machine is ready to retrace its first path, making its third cut, the first of the peat crop is ready to harvest. Our figure shows the harvester feeding the finished peat into trucks on the narrow-gauge track laid temporarily after every eighth row, where space for it has been left. Trains of these trucks are hauled off to the storage heaps at the railway.

The Excavator

A steel frame, mounted on caterpillars, carries the principal unit of the plant, consisting of digger, macerator and steam boiler and engines for motive power. The machine is of "Anrep" type. The excavating element is composed of an endless chain on which are mounted steel hoops, and occasional bottomless buckets. It moves along the working face, 40 feet, as shown in the photo and the plate. When it reaches either terminus, the whole machine moves forward automatically a distance of $5\frac{1}{2}$ inches, and the digger commences its return journey. This type of digger will take care of the small roots and stumps that occur throughout the bed of peat, and the large roots are removed by an attendant when loosened by the machine. The digger is a very effective method of delivering the raw material to the macerator, and surprisingly little delay results from interruptions in its operation.

After experiments with a number of macerating devices, an ordinary swing-hammer shredder, as used to shred wood into chips, has been found very satisfactory. Its high rate of speed effects a thorough breaking-down of cell-walls in the peat through impact, and the flexibility of the hammer arms ensures against breakage when pieces of stray iron or unusually tough roots enter the machine. The mill at present installed is being used to handle a tonnage somewhat beyond its normal capacity, and consequently its consumption of power is unduly high; but otherwise it has proved itself thoroughly satisfactory.

The peat is now "manufactured," as far as mechanical agency is covered, and it remains only to give it over to the tender mercies of "Old Sol."



GENERAL PLAN OF OPERATION FOR SINGLE UNIT ANREP-MOORE MACHINE PEAT MANUFACTURING PLANT

Belt Conveyor

As the macerated pulp must be spread fairly thin on the ground in order to dry within a reasonable length of time, it is expedient to have a wide drying field. A number of devices have been tried out to deliver the pulp throughout this field, and the final, and completely satisfactory one, is the conveyor belt shown in our plan and illustration. It is carried on a bridge composed of ten light steel trusses, which in turn rest on eleven caterpillars, driven by a single endless wire rope that engages each in turn and is actuated by a steam engine mounted on the innermost caterpillar, this same engine serving to drive the belt. The photo shows the large driving wheel of this conveyor, on its caterpillar close to the excavator, and two of the remaining caterpillars supporting the long bridge.

As the excavater moves along steadily, 5½ inches at a time, and as the belt conveyor moves ahead only when it has layed a row of peat 12 feet wide, it is obviously essential that the two should be independent in movement. A long trough fitted to the conveyor receives the pulp from the excavator, thus giving the desired flexibility of motion.

Spreader

Alongside the belt conveyor there moves slowly the spreader, driven by a gasoline motor. The pulp is continuously scraped off the travelling belt by a travelling plough, and distributed through the spreader evenly over a swath of the bog twelve feet wide to a depth of four or five inches. An arrangement like a disc harrow, with blades that also cut at right angles to the discs, marks the peat into oblong blocks. When the draining away of water underneath through the grass and moss and evaporation above cause the peat to shrink, it separates into blocks the size of common bricks along these lines.

As mentioned above, when the spreader has reached either end of the conveyor belt, the latter is stopped, and both conveyor and spreader move forward in preparation for laying another row.

Accessory Mechanisms

The efficent carrying-out of the cycle of operations necessary to win peat has involved the devising of numerous accessory machines, mainly to eleminate expensive hand labour. Prominent among these are the harvester and the combined stock-piling bridge and loader.

To devise either of these would tax the ingenuity of the average engineer; but here the problems they presented have been merely incidental to the main task. No seperate description of these will be attempted here.

Capacity of Plant

The present plant will, when operating smoothly, deliver 100 tons of dry peat per day at the railway. This excludes wastage and the amount consumed by the steam boiler to provide power. As it takes 10 cubic yards of bog to put one ton of peat at the railway, the excavator must handle 1000 cubic yards a day to attain this production.

A row of peat, as layed out by the spreader, is 12 feet wide and about 775 feet long. At present it takes 90 minutes to lay a row and move the conveyor ahead ready for the next row. This time will probably be reduced to 70 minutes eventually. A row provides 14 to 16 tons of dried peat. The capacity of the conveyor belt, the speed of the spreader and the thickness of the pulp spread on the bog can all be varied in order to provide any necessary adjustment with the capacity of the excavator.

Costs

There is at present available no detailed estimate of the cost of making peat fuel by means of the Anrep-Moore plant. Very careful and complete records are being kept, and it is expected that the results of this season's operations will provide a reliable basis for calculations of cost. In the meantime it can be assumed confidently that the cost of dry peat at the railway will be considerably below the price at which it has been sold for the past three seasons, namely $5. per ton. The various mechanisms have been designed to operate with a minimum of supervision and of hand labour, and interest and other operating charges will not be high.

The cost of the excavator, belt conveyor and spreader is estimated at about $35,000. Harvesting equipment, repair shop, track and cars, storage conveyor, power house, railway siding, etc., would nearly double this amount. With a working season of 100 days and a capacity of 100 tons per day of peat at the railway, it will produce 10,000 tons of fuel in a year.

It is clearly realized by those conversant with the problem that the production of peat fuel will never prove to be a "gold mine" to operators; but those best qualified to judge are confident that, with the apparatus now developed, a satisfactory net profit can be made.

Small Peat Machine

Along with the plant deserибed above, there has been developed a smaller plant such as would be suitable for providing a neighbourhood with fuel, without a rail haul. This machine will cost about as much as a threshing machine—say $2,000 to $3,000—and will provide a 1000 tons or more of fuel in a season. It is designed particularly to win peat from bogs that are too small for the larger machine.

Most of this smaller machine, as well as a large part of the other, have been built in the well equipped little machine shop now on the ground at Alfred.

Electric Drive

As noted above, the power used at present to drive the machine is mainly steam. This involves an inordinate weight, the boiler and accessories weighing 15 tons out of a total of 30 tons for the excavator. It is proposed to use, in future machines, electric drive, which will be both convenient and economical, whether the current is obtained from a generator at the edge of the bog or from a public supply.

* * *

In conclusion, the writer wishes to acknowledge the courtesy shown him by those in charge of the Peat Committee's experimental work. Mr. E. V. Moore is the prime mover of the undertaking, and has proved himself to be one of those ardent spirits upon whose enthusiasm, tempered with judgment, most of our technical progress depends. The amount of mechanical invention involved in developing a successful peat manufacturing plant has been huge. Part of this work of invention was already done by the late Mr. A. Anrep, Sr., of Helsingburg, Sweden, whose son, Mr. A. Anrep, Sr., of Helsing- of the Dominion Geological Survey. Numerous other pioneers in the peat industry have added their quota. Mr. F. O. Orr, who is in charge of the actual operations at Alfred, is second only to Mr. Moore in his capacity for mechanical invention. To this handful of enthusiastic workers, aided by the Peat Committee and backed by the Departments of Mines of Ontario and the Dominion, is due the fact that the difficulties incidental to all experimental work have been overcome, one after another, until now a successful issue is in sight, and with it a partial solution of the fuel problem of Canada, and more particularly of Ontario and Quebec.

Metal Props for Mines

BY ROLAND H. BRIGGS

A problem of great importance in every coal mining community is the question of roof support, including the temporary methods to be followed at the coal face to ensure the safety of the miner and correct operation of the coal cutters and conveyors, the supports of a more permanent nature required in branch roadways, and the permanent structures for the support of main roadways, underground engine houses, and the like. Although timber is the matcial most largely used in all parts of the world for roof support, its greatly increased cost has led many inventors to study the possibility of the metal support, and for more than sixty years the minds of many engineers have been busy evolving props and supports designed to embody all the good features of the wooden prop, without the latter's defects.

In a very interesting paper read before the North-East Coast Institution of Mining and Mechanical Engineers, Mr. John Roberts traced the evolution of the metal prop, and described some new supports which he has invented. From the simplest tubular props of the earlier designers, progress was gradually made until props of real effectiveness were produced, some of these having various refinements, such as an electrical arrangement for indicating the movement of the mine roof. In the War period in Britain attention was necessarily paid to effecting the greatest possible saving in timber, and a considerable impetus to metal prop development was thus obtained.

The most important requirements in a metal prop for mining purposes are that it should strong, rigid, resilient, light, durable, adjustable, reliable and of simple construction. It is of great importance that it should be capable of being withdrawn with ease as the face moves forwards, and it must be sufficiently inexpensive to compete economically with timber. The miner must be able to set it up quickly in position, and when fixed it must be safe.

In a prop designed by Mr. Roberts, oval, or partly oval and partly cylindrical tubes are employed, which can be adjusted longitudinally and can be interlocked by partial rotation. The lower member is partly cylindrical and partly oval, the oval section being provided with horizontal ribs which extend over part of the inner surface. The upper member is also partly oval and partly cylindrical, but the major axis of the oval portion is slightly shorter than the minor axis of the lower member, and when the major axes of both members are parallel, the upper member is free to move vertically in the lower member. The inner tube is provided with external flanges, which engage in slots in the outer tube.

The rotation of the inner tube through a quarter turn, tightens it by friction as the flanges become engaged in the slots. A clamp collar sliding on the upper member locks the two members in position, the collar being provided with tapering slots which engage corresponding ribs on the inner tube, this arrangement facilitating the turning of the inner tube as required.

The foot of the prop rests in a metal box in which there is a spring, which takes up the pressure when the load is applied, and a similar spring is fixed at the head of the prop. The bolt which passes through the lower spring has a large head which prevents the prop being easily displaced. The cup carrying the head spring forms a support for the lid and the lower end of the inner tube is provided with cylindrical extension which acts as a false bottom, in which there are holes for the passage of sand. The sand is used solely to give a cushioning effect during withdrawal, and to prevent the sudden drop of the inner tube when disengagement takes place.

When the miner requires to set up one of these props, he makes a small hole in the floor to receive the bolt, raises the inner tube until the cup touches the roof, turns the tube through a quarter turn and locks it, lowering it an inch or so if necessary to allow the flanges to engage the slots. The clamp collar is then lowered into position and the wooden lid driven in and tightened.

When the prop is to be withdrawn, the clamp is raised and fixed to the ribs, a chain attached to the clamp, and the clamp given a part turn from a distance. The upper member will then sink gradually downwards on the sand, which is forced through the holes, and the prop is thus loosened. In a modification of this design a metal lid is used, the final adjustment and securing of the prop being obtained by means of the wedge and lid, which are contained in a box free to move vertically.

In another type of prop by the same inventor, sand is used for supporting the upper member, and the chief feature of the prop is the flat sliding plate valve. This valve is normally closed and prevents the passage of sand into the upper chamber. Means are provided to prevent it being accidentally opened or completely withdrawn from the tube. When the prop is to be placed in position, the valve is opened so that sand passes into the upper chamber. The prop is then adjusted and the sand run into the lower chamber and the valve above the middle chamber closed. Thus as the load comes on the sand, it is compressed and gradually yields. When the prop is to be withdrawn the valve is opened by means of a chain from a safe distance, the sand flows back to the upper chamber and the prop is gradually released. Facility and safety of removal and the retention of the sand within the prop are the special features of this design.

In addition to the temporary props described above, designed for use at the coal face, the more permanent types required for branch roadways were also described by Mr. Roberts, and improved designs of girder and horseshoe sets were discussed. In a modern form of steel set, the crossbar is of I section, and is supported by legs, each of which consists of two channel bars bolted together and resting on a cast-iron shoe. A number of bolt holes are provided in the legs and collars, so that the sets may be adjusted to suit various sizes of roadways. The required batter of the legs is obtained by means of the cast iron shoe, the under side of which is curved and rests on a sole piece.

The horse-shoe set is another form of support which has had considerable popularity with inventors, but to which there have been some objections. The steel arch is also popular and an improved general design is suggested. This consists of H iron supports, the webs of which are expanded at the crown, so that the two members form an interlock. At the haunches, a double flange and web provides additional support, which resists the tendency of the arch to collapse prematurely at these points. The lower ends of the sides of each unit are so formed that the advantage of the arch shaped structure is retained. The additional vertical struts provided are adapted to take most of the stresses acting on the roof of the structure, and the inwardly curved side members resist the tendency to buckle. Iron and steel is now largely used in conjunction with masonry and concrete for the permanent structure of the main roads and underground buildings, and the fact that steel and iron supports can be made of any desired shape and size is a feature which should be taken into careful consideration when roof supports are being discussed.

New Report on Kenogami, Round and Larder Lake Areas, Ontario

The Dominion Geological Survey has just published Memoir 131, *Kenogami, Round and Larder Lake Areas, Timiskaming District, Ontario, by H. C. Cooke.*

This report contains a fund of information for both the scientific and the economic geologist interested in the gold-bearing district of Northern Ontario and Quebec, as well as hints to those prospectors, ever increasing in number, who take advantage of the aid that geology can afford them.

Two of the three geological maps that accompany the report (Kenogami and Round Lakes) are of contiguous areas between Fort Matachewan and Larder Lake. The third covers the Larder Lake area. Of the first two areas, Dr. Cooke remarks that "no deposits of economic importance have been found up "to this "of economic importance have been found up to this "time (1919). Mineral indications so far have been "confined to the small areas of Keewatin rocks." After his thorough geological survey and study of the rocks, he concludes that "the geology of the area discourages "the expectation that valuable gold deposits will be "found in it."

The geological study of the Larder Lake map sheet is given in more detail, and Dr. Cooke's conclusions are of first-rate importance in the study of the rocks of the region. His summarized conclusions are as follows:

"The sedimentary rocks of Larder area, formerly considered to be a part of the Keewatin, are a series continuous with the Temiskaming of Teck, Lebel, and Gauthier townships, and correlated with the Pontiac series in Quebec to the east.

"The Keewatin was thrown into gentle folds, whose limbs had dips of 20 to 30 degrees, and was eroded, before the Timiskaming was laid down on it to a depth of as much as 1,500 feet.

"Volcanic rocks are recognized for the first time in the Timiskaming series. The most widespread of these is a soda trachyte. Extrusions of basalt or basic andesite also occur.

"The slates of the Timiskaming series, which are apparently confined to the Larder area, are fine-grained greywackes, in which ordinary clastic material is mixed with a certain amount of basalt ash.

"A rather wide variety of intrusives has been recognized, including feldspar porphyries of two different ages, a quartz porphyry, several lamprophyres, and a syenite. As gold deposition in other districts is recognized as having a genetic connexion with porphyry intrusives, it is evident that it will be of importance in the future to distinguish which porphyry has carried the gold.

"The Timiskaming series and the underlying Keewatin are folded into a series of close folds. These are secondary folds on the flanks of a large synclinorium, whose north limb has a dip of about 16 degrees south, the south limb of about 29 degrees north. The minimum thickness of the upper, closely folded strata is calculated to be 8,900 feet. The eastward pitch of the folds affords a natural explanation of the fact that the Pontiac series in Quebec is very much wider than the Timiskaming in Ontario.

"The dolomites of Larder area are shown to be secondary rocks, resulting from the alteration of slate greywacke, conglomerate, porphyry, or basalt. Some of the smaller bodies have been formed by solutions emanating from quartz porphyry dykes, pegmatite veins, or individual quartz veins, but the larger have been localized along shear zones. Partial alterations at first took place by entry of solutions along cleavage planes; the alteration was completed by fissuring and further entry of solutions through the fissures. Dolomitization was caused by juvenile solutions, probably exhaled by a large underlying body of magma which gave rise to the soda trachyte and the two porphyries.

"The gold of Larder lake was deposited as native gold in minute fractures in the quartz veins that cut the dolomite bodies. It was, therefore, probably carried by the final exhalations of the magma, the earlier solutions from which caused the alteration of the various rocks to dolomite."

Referring to the economic geology, Dr. Cooke remarks significantly, that "the same winter [1906] over forty "mining companies, with a total capitalization of nearly "$100,000,000, were organized for the purpose of carrying on development work when the snow should disappear. The natural failure of most of the claims to "produce anything, and the consequent disappointment "and loss of money to those who had invested in the "companies, gave the camp a serious set-back, and retarded the development of its more promising parts for "years."

Of the gold itself, we are told that "the gold occurring in the dolomite bodies occurs wholly in the free "state. The examination of the thousands of feet of "drill cores and of the assay values later obtain from "them which were placed at the disposal of the writer "by the Associated Goldfields, showed that absolutely "no connexion exists between the concentration of pyrite, the only sulphide in the rock, and its gold content."

* * *

A decided reaction against the editorial shears draws attention to the fact that the geological Survey has now (at last) adoped a most excellent paper for its reports. This is as it should be: for these reports constitute a large part of the foundation upon which our mineral industry is built and are consulted and thumbed not only in Canada but throughout the world, for decades after they are printed.

Six weeks from now the American Electrochemical Society will be in session in Montreal. The term "American" can here be interpreted in its proper and inclusive sense, for this society represents the electrochemical activities of the whole continent. A large part of its interest is in electro-metallurgy, which is a part of our Canadian mining industry that is now of prime importance, and that promises to become rapidly of still more consequence. A feature of the meeting is an excursion to Shawinigan Falls, where the conjunction of cheap power, good railway facilities, central location, and readily available raw materials has resulted in a truly wonderful electro-chemical and electro-metallurgical development.

The Constitution of Coal

ABSTRACT OF THE FIRST OF FIVE LECTURES DELIVERED AT SHEFFIELD UNIVERSITY, ENGLAND, BY DR. MARIE CARMICHAEL STOPES.

Common house or factory coal, generally known as ordinary bituminous coal, is banded or streaky, and appears to the naked eye to be black. In most geological text-books coal is classed as a mineral. The old name used, indeed, to be "stone coal" but this is misleading, for coal is not a mineral at all, but a mummy.

What is coal? At a meeting of the Society of Chemical Industry in 1918, I had the temerity to define coal provisionally: "Ordinary coal is a compact, stratified mass of dismembered, mummified plants free from all other matter, save for the mineral veins, partings, etc., which are local impurities". To be coal the deposit must be substantially a deposit of plants alone. Impure coals may grade into oil shales and a variety of other products.

In mummifying animals and human beings the ancient Egyptians took out the softer viscera and replaced them with resins and preservative substances. Similarly, in coal the softer parts of the plants are naturally attacked first by the bacterial action and decay, and the "resins" accumulate, tending alone to be represented after the decay of portions of the soft tissues of the plant mass.

There is no foundation to the idea that there was a special form of flora in the "Coal Measure epochs" which gave rise to the accumulations forming coal. Any portion of any plant is capable of forming coal of a sort. There is nothing in the Coal Measure flora which makes it particularly coal-producing, for given equally favourable physiographical conditions leading to accumulating deposition, any other flora of any other geological epoch would make coal.

The Locus of Coal Deposits

In some form or another, either in large lagoons or lakes, estuaries or brackish marshes, the coal forming material drifted and sank. One may classify the ways of accumulation as follows:—

In Sea Water

Drifted land material, which may travel far, settling waterlogged beyond the reach of mineral detritus.

Fucoid Algae, forming shore accumulations.

In Brackish Water

In situ material, the dropping of coastal forests.

In situ, or partly *in situ* swamp and bog plants.

In Fresh Water

In undisturbed lakes, from forest debris, or pure "plankton" or microscopic life of the lake plants growing *in situ*, or all these mingled.

In estuaries, river beds and deltas.

In large swamps interspersed with lakes.

On Land

Highland moors of various types, mosses, moor peats.

Peat and forest, mingled or alternating.

Dry forest floor accumulations.

This fundamental fact, viz. that all vascular plants share the same chief types of tissue cells is the explanation of the gross similarity between coals of very different geological ages. Any Cretaceous or Tertiary coals may be substantially identical in their response to the ordinary chemical tests with coals of the Palæozoic age, though the species of plants forming the two coals are entirely different.

The Isolation of Coal

The method of dealing with coal must be much more accurate and refined before the distinctive contributions of different plant species can be recognized. Of the various tissue substances widely scattered in all plants, such as lignin, nuclein, cellulose, "resin," and so on.

The chemist who analyses coal in bulk for the great commercial enterprises which use coal by the hundred tons, has got into the way of presenting his analysis in a form which may be of value to the commercial man, but which does not indicate in the least the real chemical composition of the substances comprising such a mixture. Indeed I consider that the chemist's knowledge of coal at the present moment is that of the Dark Ages. It is misleading in a way exactly parallel to the confusion in analysis which would be created were a mixture of say, 20 different mineral compounds pounded all together, analyzed merely for the elements. Yet in their analysis of coal chemists present but a crude tabulation of percentage of the elements contained, not in any one compound but in this mixture of compounds!

The Constitution of Coal

Realizing this very clearly a few years ago, I set to work on certain differences in coal which appeared to me to be so obvious that in a block of coal, only a few inches big, the naked eye could detect four physically different bands or zones. These microscopically recognizable portion of coal are to be found in most ordinary bituminous coal, and I named them provisionally as follows:—

1. *Fusain*—The equivalent of "mother of coal", "mineral coal" etc.

2. *Durain*—The equivalent of "dull" hard coal.

3. *Clarain* and, 4. *Vitrain*—together the equivalent of "bright" or glance coal. Sometimes the "bright" coal of an author seems to be the vitrain only. Vitrain has a conchoidal fracture.

These names do not represent chemical entities (with the possible exception of vitrain), but they do represent tangible entities of the same useful order as "jet", "granite", or "cheese".

The generally "streaky" or banded nature of a seam of coal is of varying magnitude, and as one magnifies a banded piece of coal more and more it becomes increasingly apparent how finely laminated it may be. The average "dull" band is from $\frac{1}{4}$ inch or more in thickness, and is all through visibly streaked with fine lenticles of "bright", while the "bright" portions are streaked with very variable bands of "dull" and the "bright", both the fusain and the vitrain, are all essentially lenticular masses, these are often so horizontally extended and so thin that they create the impression of being fine horizontal bands. The fusain is the least regular in its arrangement, but on the whole its more wedge-shaped portions tend to be so as to be most apparent on the surfaces which are split parallel to the bedding.

Vitrain is particularly interesting. These brilliant bands are more definitely distinguishable from the rest of the coal than are the bright clarain and the dull durain from each other. True vitrain generally forms a very definite and often sharply straight-cut band varying from 2 mm. to 6 mm. or 8 mm. in thickness. There are also brilliant streaks of smaller size down to almost hair like flecks. The larger, however, are more typical of the vitrain zones. They are notably less numerous than the zones of glossy bright clarain and are differentiated by the fact that clarain under the

gloss, will always show streakiness, whereas vitrain will not.

As observed by the naked eye, *fusain* occurs chiefly as patches and wedges, somewhat flattened parallel to the bedding plane, and often with rather square-cut ends. It consists of readily detachable, somewhat fibrous, strands. The various wedges on a bedding plane lie at various angles to each other, so that in any given light some appear dull and some glisten.

When a thick wedge of fusain is contignous to a true vitrain band, the fusain may appear as though embedded or sunk in the vitrain. The fusain can then be scooped out in short, fibrous strands and small, sharp-pointed, irregular fragments, the surface of the vitrain being left smooth and curved.

Durain is hard, with close, firm texture, which appears granular even to the naked eye. A broken face is never truly smooth. It always has a finely lumpy or matted surface. Generally a few flecks or hair-like streaks of bright coal are to be seen.

Clarain occurs as bands of very variable thickness, which are ultimately widely extended lenticular masses. Even where streaked with durain, clarain has a defined and smooth surface when broken at right angles to the bedding plane. These faces have a pronounced gloss or shine. This lustre is inherently banded and shows bands of fine durain.

Vitrain occurs in definite narrow bands, sometimes straighter and flatter than the other bands of coal, and sometimes more obviously lenticular. The limiting layer between the vitrain and the contiguous clarain or durain is generally sharply marked. There is no fine interbanding detectable, but it is a uniform, brilliantly glossy, vitreous whole in its texture. The conchoidal fracture is characteristic.

Under the microscope *fusain* is almost black, opaque, and when it shows the cellular structure of the wood from which it was formed, it reveals the walls as much thickened and the cell lumina as being generally empty.

Sections of *durain* show a granular matrix of roundish or polyhedral fragments, the majority of which are blackish or opaque. The granules are closely packed and form a coherent mass, but mixed with them are the most characteristic spore exines. The ground mass of rather opaque granules, and the large, clear macrospore exines tend to preponderate. The small, clear, lenticular bands or flecks of a more golden colour seen in the durain are streaks of clarain. Other light coloured bodies to be seen in the durain are the supposed "resin" bodies.

Clarain is essentially clear. Plant tissues preserved in it are translucent. Opaque streaks of durain should be looked upon as an impurity. Clarain is the happy hunting ground of the paleontologist in search of preserved remains of the tissue composing coal.

Vitrain is essentially uniform, structureless, and may be compared to a hardened glue or jelly.

All four substances, fusain, durain, clarain and vitrain, show sufficient variation and characteristic differences of response to chemical tests to mark these substances as being distinct from each other. The coking qualities of each are markedly different.

* * *

Both the microscopic study of the petrography of rocks and the microscopic study of the internal structures of metals at their initiation seemed researches remote from practical use. Both, however, have abundantly justified themselves, not only in the scientific world but as aids to practical men of affairs.

Similarly I maintain that knowledge of the minute structures and the chemical properties of the individual substances composing that highly complicated mixture known as "coal" will be justified in its turn.

Indeed I am bold enough to maintain that until we attain to a recognition of its differing essential compounds (which is the chemical worker's investigation of coal), the chemistry of coal will remain in the Dark Ages.

MINING AT RICE LAKE, MANITOBA

The Luleo claims, north of Hole River, are showing up well under development, according to Mr. Frank Phillips, the superintendent. The drift on the 100 foot level is in 240 feet, and sinking the main shaft to 300 feet has been started. The shaft is timbered to the 100 ft. level. The ore is running high in sulphides and in gold. Mr. Phillips is well known in Nelson and the Kootenays, and has a reputation for making conservative statements.

The history of these claims has been a chequered one. Every engineer who has examined the property was favorably impressed with the veins, which are well developed and can be traced over two full claims, with a width varying between 10 feet and 100 feet. The ore gives high assays wherever the sulphides come in, sometimes, it is believed, up to $130 a ton. There is a band of compact sulphides along each wall. The values in the intermediate region are from poor to moderate, but the average of the whole should be sufficiently high to pay if mined on the grand scale.

There is a twenty-stamp mill on the property, which was put there long before there was sufficient stoping ground to justify any such plant, simply because the then holding company acquired the whole outfit at a bargain price. They found themselves with a plant complete down to the assay balances and the fittings of a machine shop, at a price that was tempting; under the circumstances they were possibly wise to transport the mill from the Lake of the Woods to its present site north of Hole River.

The original company went into liquidation, through incompetent management, and a large sum of money was absolutely wasted; but under Mr. Phillips some excellent work is being done at a reasonable cost. Providing all goes as is hoped and expected, this property should restore confidence in the Rice Lake field — something it needs badly.

Mr. A. M. Stewart has a 2-stamp testing mill on the Kingfisher claims, and the other day took a 14-pound gold brick into Winnipeg. He is trying to make the mine pay as he goes, merely endeavoring to prospect the claims thoroughly with the money from the ore he takes out during development.

There is a rumor, which is is impossible to substantiate, that silver ore has been found near the head of the Manigotagon. If there is any truth in this report, the ore is probably on the Ontario side of the boundary, as samples of silver have come from the region just north of the English river in the latter province.

C. A. B.

The monthly report of the Department of Labour, Ottawa, on employment shows that during June there was a notable increase in the numbers employed in the mining industry, over both the preceding month and the corresponding period in 1921.

News and Comments

By ALEXANDER GRAY

Loss to Asbestos Industry

The death of General Manager J. D. Sharpe of the Asbestos Corporation, after a lingering illness, is deeply regretted by all who are familiar with his sterling service throughout ten years, for his principals and for the Asbestos Industry as a whole. The operating executive of the chief factor in the industry, Mr. Sharpe's position and diversified responsibilities made him prominent, and his personality matched the pre-eminence of his corporation. He effected many economies; saw production and prices at their peak; planned during the period of depression for the expansion he knew would follow; and, just as substantial revival is proceeding, he has succumbed. Born in Pennsylvania, eminently equipped by his experience in the coal mines of that State, he devoted himself to the Asbestos Industry with fidelity and ability, and had the satisfaction of bringing Asbestos Corporation operations to the highest efficiency.

Lake Shore Results

Official assurance by President Oakes that the $2,000,000 (approximately) yielded thus far by Lake Shore Mines represents "probably not more than 20 per cent. of the ore indicated above the 600-ft. level" convincingly offsets what would otherwise be disappointing results reported for the year ended November 30, 1921, which were neutralized somewhat by decided operating improvement in the six months ended May 31st last. As the mining position is amply protected, and since it is common knowledge that recent developments have disclosed exceptional enrichments, there is proof positive that the Lake Shore will have a prosperous outputting career from which excessively high costs alone will detract. No doubt the showing made is due to special reasons; otherwise shareholders might have more apprehension. Moreover, they are familiar with the sporting spirit of Mr. Oakes, displayed throughout the years of his activity in the Kirkland Lake gold fields. At the same time, it is due to the shareholders that the factor of costs as disclosed be elucidated.

The company will be felicitated upon the announcement that there is 28,298 tons of ore broken in the stopes, valued at $700,730, an average of about $25 per ton. This is more than a year's milling supply, on the present crushing basis. Presumably the breaking of that ore entered into the item of operating cost but, even so, the ratio of cost to profit is so abnormal as to suggest greater regard for the economies. Selective mining under the circumstances is too expensive. Only the exceptional grade saved a situation that might prejudice the Kirkland Lake fields in the public view.

"To mill 21,681 tons for a total bullion production of $460,186", as the daily newspapers express it, and to have "expenses given at $345,212", makes it appear as though the per ton milled cost was $15.92. The total income of $520,930, evidently included the premium upon gold. Anyhow the profit was $181,723, from which there was deducted $130,000 on account of Exhaustion and Dominion Taxes, leaving the net profit, $51,723. So the year ended November 30, 1921, may be considered somewhat of a hiatus—and a recurrence would not be helpful.

Fortunately, (and more to the point), the results for the six months ended May 31st, 1922, dispel doubt, taken in connection with the mining position and plans for development and milling expansion. Hereafter, with the milling policy revised, the mine should run truer to form. Bullion produced in the six months amounted to $309,637, and the total income was $323,908. The net profits, aside from allowances for Exhaustion and Dominion Taxes, were $169,167, or only $12,556 less than what they were for the whole of 1920-21. If the special reservations are taken from this, however, there still remains an incentive for increasing the production and profits in order to justify the market valuation of Lake Shore shares. Of course the profit-and-loss surplus is being handsomely conserved, and the mines are stronger than ever. Yet it is not clear why costs were so high. President Oakes promises to provide what the property needs, once the shaft is enlarged and development to the 800-ft. level is accomplished. Lake Shore is one of the strongest arguments in favor of Kirkland Lake, — but the reports just published are unattractive as window-dressing. Undoubtedly the management has a justification it might proffer.

Is the Lake Shore Over-Mined?

In commenting upon the Lake Shore reports, and doing so with a constructive purpose, it is not overlooked that the indicated ore above the 600 foot level is said to be worth four fold the capital of the company. It is the relationship of profits to production that is the question at issue; dividends have to synchronize with market valuations, and costs have their limitations where shareholders are concerned. No harm will be done, if the policy has been temporarily in the direction of over mining or over developing, and a statement to that effect is forthcoming. Undoubtedly the admission that the mines are eighty per cent. intact above the 600-foot level, and that the indicated ore in that section is valued at about $8,000,000, makes it explicable why milling has been minimized and mining magnified. But it might be that the average cost, as applied to the 1920-21 tonnage milled, was in excess of the average of the mines—and that is open to question.

Oil Shale Boom in South Africa

Resumption of work on oil shales in New Brunswick under Anglo Persian auspices has not attracted much notice. Canada is indifferent in the matter. Not so in South Africa, although what is going on there may not prove profitable. The Slangapies Oil Shales Company, having to do with a Wakkerstroom district area, in the Transvaal, is capitalized at £30,000 and holds options on 10,000 acres. That amount of money may do some drilling and make a few initial payments, but infinitely more will be needed if the promoters are in earnest. An oil shale enterprise known as the African Oil Corporation, is said to "have 7,250,000 tons of workable and highly profitable shale." Canada's Maritime Provinces have many millions of tons of high grade shales, they might be more interesting if they were further away!

The "Bickell Group"

If all goes well there will be a Bickell Group of gold, silver and coal mines. At the Rand, the Group System is in vogue. Parent organizations have proprietary privileges and subsidiaries—all the latter not always compensatory, else there would be no "mining risk". The pro-

cess is preliminary investigation by central organizations; underwriting by individuals or affiliated groups; technical control and administration by the party of the first part. Ordinarily, when the going is good, it works like a charm — and that is why the activities of the McIntyre company of Porcupine, with the McIntyre-Jupiter Pearl Lake Plenaurum gold areas and the Blue Diamond Coal commitment and slow assets, are suggestive of a larger organization, re-financing, and what not. In line with these extensions is the more recent acquisition of what is known as the "Schumacher" Veteran claim adjoining the Dome properties, the purchase price being stated at $400,000. Formerly this veteran claim (once held jointly by the Schumacher interests and Fred. Connell) was proffered to Dome Mines for $250,000. Meanwhile Dome developments undoubtedly have increased the potential value of the Veteran claim, and if the Dome company would not pay the price, McIntyre did. How the McIntyre company is going to finance all these undertakings, probably will be outlined in the near future. The American end of the Dome and McIntyre companies is somewhat inter-related, and the situation suggests a co-operative plan rather than have the McIntyre Mines carry the total liabilities. At any rate Mr. J. C. Bickell as Managing Director of a series of gold, silver and coal properties is a full-fledged magnate. The advent of subsidiaries means that the McIntyre is becoming a holding company — and as such will need more working capital.

The Irony of it

Facing a possible coal shortage, officials at the Dominion seat of Government, coal dealers and others, formally resolved to "purchase Welsh and Canadian coal, if need be." Making a virtue of necessity has its ironic aspects — and they need not be emphasized. Domestic fuel would appear to be a *dernier resort.*

"Seeing the Light"

What has the car marks of a soporific suggestion under a Dane date line, contains the statement that the Associated Goldfields of Larder Lake are looking toward Porcupine for an opportunity to employ what remains of the treasury cash. The message reads rather quaintly; it is of the "pussy-footing" variety, setting forth that "the efforts of the company in the Larder Lake district have covered quite a number of years", but "nothing of much importance has been developed on the original properties." This, it is urged, "is understood to be the reason for the present movement to secure property in the Porcupine district." But when it is claimed that "well over a million" was spent on the "originals", and that "nothing has been done toward even attempting to put the enterprise on a paying basis by way of production", we have to dissent. The trouble is that too much was done in and about properties that disclosed themselves to be hopeless. Those directly responsible fatuously persisted in expending money. To chide them for having done "nothing" toward "erecting a new mill", and to say that reports are "very conflicting" about "the possibility of dealing with the low grade material at a profit", is strictly inaccurate. There is no "conflict" as to the unprofitability of the "low grade material"; it is a clear case. Whether Porcupine or Kirkland Lake, or any other worthy area is to be the scene of Associated adventures, the sincere wish is that there will be no more tol de rol. There is a great deal more pleasure in being able to be complimentary than there is in applying the scalpel or the lancet. "Seeing the light" is in the nature of self-administered first aid to Associated Directors. They have been on the road to nowhere. We would gladly see them on the way to Somewhere.

Ancient Mariner Hikes North

Fresh and florid from Moville, the Donegal jumping-off-and-on-place for trans-Atlantic passengers, Capt. J. Iriam Jones is on his way north. He has piloted many a staunch vessel along the risky and torpedo-strewn waters of the channels. All kinds of weather were the same to him, afloat or ashore. No one suspected that he and his life partner had half-a-section of land near New Liskeard, Ontario, that had more in the locker than the average mariner really requires to keep his old tobacco box filled and provide a tot or two as stimulant. The secret was not divulged until the Captain arrived in Montreal and announced that Mrs. Jones, born at Kingston (her maiden name being Orr), inherited from her brother, some quarter of a century ago, a tract of land from which samples of silver, cobalt and niccolite were obtained. Among the captain's baggage he brought along the samples (which he will have assayed at Sudbury) and while he is building a shack, Mrs. Jones will visit friends. Just as soon as he can, the captain intends to get busy and heave a lead, as it were, to ascertain how many millions there are to be had for the taking. According to the newspaper accounts, the captain is his own plain-spoken press-agent — and an effective one. New Liskeard is famed for its garden truck — which should give the captain a deck cargo. If he has eight claims containing the minerals characteristic of Cobalt and environs, it will be in order for him to call all hands and splice the main brace, fill 'em up again, and entertain his friends with yarns infinitely more interesting than those of "Captain Marryat." Unfortunately, as the skeptics see it, the vicinity of New Liskeard has not been noted for its bonanza ores—apart from the Casey. However, the romantic tale makes Capt. Jones a welcome addition to the ranks of North Country optimists—the army of Great Expectations.

Silver Islet Re-discovered!

The Mining Journal's own Laureate has a theme worthy of his "prophetic soul" or his peripatetic muse, in the alleged re-discovery of Silver Islet,—that datum line of silver production in the bone-dry belt—between times. After being in the abandoned class for thirty-five years, it is told us by *The Globe's* Port Arthur correspondent that a Duluth syndicate went into the old workings and found a 2,000 oz. vein in a "drift, just where activities were stopped."

The announcement is the more remarkable because of the statement that work was resumed two years ago "but nothing has been found of startling magnitude until the present find". If the spectacular vein was located in the abandoned working face, it is extraordinary that the discovery was not made until July 6th of this year. "The Engineers" intended to "strip the roof of what silver could be found in order to re-imburse the syndicate for the money already expended". Lo and behold, there was "the same vein which engineers of more than a generation ago were following when work mysteriously stopped"!

So all the tales of flooding and failure were fabrications! A while back it was stated that "a delicate vein" had been found. However, now the mystery is solved. Where it was, there it is, as the "Cousin Jack" remarks. It will be better to have another look at the face.

The Southern Rhodesian gold output for May 1922 amounted to 53,920 ounces as compared with 54,318 ounces for April 1922 and 48,744 ounces for May 1921.

Investigation by the Mines Branch, Department of Mines, During the Current Year

FIELD INVESTIGATIONS OF MINERAL RESOURCES

During the current year the Mines Branch will undertake field investigations of mineral resources and their technology through nine parties. The investigation of our mineral resources and of the technology of their mining, treatment, and use provides, primarily, a national inventory of our mineral wealth. The great value and importance of such an inventory was amply demonstrated when these resources had to be called upon for their maximum contribution to the national defence. In the immediate utilization of these resources the investigations conducted furnish the interested consumer, investor, or prospector with a record of the localities where the occurrence of the economic mineral resources has already been determined, and with the available data as to the extent both of their occurrence and of their exploitation. To the owner, discoverer or expectant operator is furnished the collected and accumulated data respecting the physical and chemical characteristics of mineral products; descriptions of methods of mining and treatment commonly employed; the specifications as to the composition and character of the products required to meet market conditions, the uses to which the products are put; the industries in which they are employed, and the essential commercial data respecting markets, prices, production, consumption, etc.

A. W. G. Wilson will complete a report now under way on the development of chemical and metallurgical industries in Canada, and will spend a portion of the field season in the collection of additional information on the above industries for departmental records, and in the investigation of the technology of molybdenum and the mining industry in respect to certain metals.

A. H. A. Robinson has been investigating iron ore resources in Canada during the past eleven years, chiefly in magnetometric surveying, and will continue to study the present operating conditions in the iron mining industry.

V. L. Eardley-Wilmot is engaged in the completion of the mining sections of a report on molybdenum and its uses and will make field investigations in respect to the present condition and progress being made in non metallic industries.

Howells Frechette will continue and complete an investigation of mineral pigments in Eastern Canada, and, as Acting Chief of the Division of Ceramics and Road Materials, will, if time permits, make some field studies in respect to present conditions in the clay working industries.

Hugh S. Spence is investigating conditions in respect to the requirements of the British market for a number of non metallic products such as mica, graphite, feldspar, etc., and the progress being made in experimental work with a view to determining possible uses of bentonite. If time permits, Mr. Spence will initiate an investigation of abrasive minerals in Canada with particular reference to corundum, garnet, diatomaceous earth, etc., as well as the production of artificial abrasives including the silicon carbide products and the aluminous abrasives.

L. H. Cole assisted by Frank McNiven will continue the investigations begun last year of the saline lakes and springs of Western Canada, with a view to determining their distribution and extent, and their economic possibilities. These saline lake deposits consist of mixtures of salts of sodium, magnesium and potassium, in varying proportions.

S. C. Ells will complete the mapping of the bituminous sand area in the McMurray district, involving the surveying of the Athabaska river valley from township 88 to township 98, and the sinking of a limited number of test pits, in order to supplement the imperfect information afforded by actual outcrops of bituminous sand. It is anticipated that under favourable working conditions the work of this season will permit the completion of the detailed field investigations of the bituminous sands of the McMurray district, upon which work has been in progress for a number of years past.

H. Gauthier will continue a road material survey in the Canadian National Rocky Mountains Parks, in connection with the construction of roads undertaken under the auspices of the Parks Branch of the Department of the Interior.

R. H. Picher will continue road material surveys begun in 1920 in the Province of Nova Scotia.

The two latter investigations will be supplemented by laboratory tests, by standard methods, of numerous samples of materials collected, the purpose being to supply the engineers on public highway construction with valuable information as to the comparative road making qualities of the available supplies of material in the neighbourhood of the highways being constructed.

LABORATORY TESTING AND RESEARCH

The laboratories or experiment stations of the Mines Branch are comprehensively equipped for testing and research investigations on ore treatment, on fuels and oils, with particular reference to their physical and chemical character and their recovery and utilization, on clays or ceramic and refractory materials, on rocks, sand and gravel used for road building purposes etc. A staff of five engineers and fourteen chemists with laboratory and mechanical assistants, are engaged upon the investigations noted below.

ORE DRESSING AND METALLURGICAL DIVISION

In this division, under the direction of W. B. Timm, Messrs. C. S. Parsons and R. K. Carmodian, with the assistance of a staff of chemists, are carrying on the following investigations on ore treatment:

Copper Ores: (a) The completion of experimental work on the concentration by flotation of the low grade copper ores of Hidden Creek, Alberni, B.C. (b) Completion of experimental work begun during 1921 to determine a metallurgical treatment of the [illegible] or sulphide, ores of the Elk View Copper [illegible] etc. An investigation of methods for the concentration of the disseminated ores of the Elk View group.

Copper Nickel Ores. An investigation begun during 1921 is being continued on the concentration of low grade copper nickel ores of the Sudbury district. The investigation will be extended to ores from [illegible] other localities such as [illegible]

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Port Arthur, Ont., and the Maskwa River district, northeast of Winnipeg, Man.

Zinc-Lead-Silver Ores: (a) An investigation, which will involve extensive test and research work, is being conducted on the metallurgical treatment of the ores from the Sterling Mine, Cape Breton. (b) Lead carbonate ores from Arrowhead, B. C., carrying gold and silver values, in which the gold is the principal metal to be recovered, are being investigated with a view to determining a process adaptable to the treatment of the ore.

Gold Ores: In view of the activity in the development of gold properties, it is anticipated that a number of applications will be received for experimental test work on some typical gold ore.

The Milling of Asbestos Rock: During 1921 experimental work was conducted on the use of the conical ball mill for the cracking of asbestos rock and the liberation of the fibre. It is proposed to continue experimental test work on the application of a wet process for the crushing of the rock and recovery of the fibre.

The Concentration of Garnet From Its Rock: Investigations conducted during 1921 on shipments from three different localities will be supplemented by further experimental test work on shipments from other localities.

The Concentration And Separation of Fluorite of the Madoc District from Associated Minerals: An investigation is being undertaken to develop a process for the separation of fluorite from its associated minerals, such as barite, calcite, and silica.

Platinum Group Metals: Some experimental work already in progress will be continued on the recovery of these metals from placer concentrates. Work will also be undertaken in connection with the investigation of the presence of these metals in certain copper nickel ores.

Removal of Impurities from Coals: It is proposed to initiate an investigation on the washing and flotation of coals for removal of impurities such as slate, pyrites, etc.

The Use of Flotation Reagents Manufactured in Canada: This investigation is a continuation of one undertaken on the treatment of Cobalt ores in 1917, as a result of which valuable information was obtained in connection with the treatment of Cobalt ores. The present investigation is being carried on with all Canadian ores which are being treated by flotation, for the recovery of valuable minerals, and will not be confined to hardwood oils alone, as was the previous study, but to other reagents used, or which can be used and manufactured in Canada for this purpose. A considerable amount of data has already been collected, and with the co-operation of the mining companies using flotation a systematic investigation will be carried out in order to stimulate the use of Canadian made flotation products in place of imported oils.

Amber: An investigation is being undertaken on the concentration and separation of amber from western coals. This is being supplemented by an investigation in the chemical laboratories on the physical and chemical characteristics and possible uses of the recovered amber.

DIVISION OF FUELS AND FUEL TESTING

Under the direction of Mr. B. F. Haanel, investigations are being carried on by Mr. E. S. Malloch, Technical Engineer, and Mr. R. E. Gilmore, Chief Engineering Chemist, and a staff of engineering chemists.

Lignite Coals: (a) Investigations are now in progress on carbonization. Small scale experiments originally applied to the lignites of the Souris Valley, Saskatchewan, are being applied to the various grades of Alberta lignites. (b) Investigations are designed to be undertaken in respect to the alterations of lignites which are effected by heat and other treatments, with particular reference to (1) the character of the carbonized residue, yield of gas, tar oils and ammonia; (2) thermal reactions covering a wide temperature range to determine exothermic and endothermic points; (3) physical and chemical examination of residue with regard to briquetting qualities; (4) the effect of varying pressure and atmosphere in retort on the quality of the residue; (5) the determination of physico-chemical properties of raw lignites and their products.

Oil Shales: An investigation is in progress respecting the destructive distillation of oil shales, with particular reference to the changes which take place when oil shale is digested in a bath of oil according to the Ryan process. It is proposed also to carry on other investigations in respect to the distillation of oil shale and on the retorting of oil shales on a large experimental scale for the purpose of recovering sufficient oils to investigate their value for refining into motor spirits, lubricating oils, etc. The problem of standardization of a medium scale laboratory method for the examination of oil shale samples is also under investigation.

Peat: Research work is being continued on the heat or other treatment to which peat should be submitted for producing the largest quantity of motor spirits, lubricating and other oils, and for determining the value of peat for the manufacture of alcohol, and the treatment that may be necessary to make it suitable for briquetting.

Pulverized Fuel: Large scale tests are being undertaken on the generation of steam by the use of pulverized peat, lignite and other coals.

Domestic Heaters: Investigations are in progress with a view to determining factors and suggesting alterations in design of heaters to permit the more efficient utilization of fuels other than anthracite.

DIVISION OF CERAMICS AND ROAD MATERIALS

Laboratory tests on clays and shales are being conducted to such an extent as is possible with the available staff. The examination and testing of road materials is carried on chiefly during the winter months by the engineers who, during the field season, are engaged in the study of field conditions and in the collection of the samples. In connection with the latter work it is also proposed to carry on investigations of methods of testing. The Road Materials Division is allied with organizations of a similar character which co-operate, through the medium of the American Society for Testing Materials, to the end of advancing knowledge in the testing of road materials.

A further million pounds of gold has been retrieved from the White Star liner Laurentic which was mined off the coast of Donegal in 1917. There is a possibility that the balance of the submerged gold will be recovered within the next few months.

News of Mining

Great Britain

At a general meeting of the Gold Fields of Mysore and General Exploration, Limited, held in London recently, announcement was made to the effect that a subsidiary company was in process of formation for the purpose of investigating and acquiring mining properties in Canada. Engineers have already been engaged to conduct the work.

At Llanlarcy, near Swansea, the Anglo-Persian Oil Company, Limited, has completed a huge oil refinery. The whole plant occupies somewhat more than 600 acres. The daily capacity is 2000 tons of crude oil. It is equipped to produce every kind of petroleum product.

The annual report of the Shell Transport and Trading Company, Limited shows a net balance of £ 7,495,-010.5s. 5d. to be carried forward. The authorized capital of the company is £33,000,000.

From latest available reports it is learned that the number of unemployed mine workers in Great Britain is 97,000. Of these, 56,000 are in receipt of "benefit."

United States

All branches of metal refining are now becoming normal in Montana. The United States Geological Survey reports that last month most of the copper and zinc mines at Butte, the smelting plant at Anaconda, and the electrolytic plant at Great Falls were in full operation. Gold production fell considerably during 1921, as compared with the year 1920, silver production decreased heavily; copper outputs amounted to only 10 million pounds, as compared with the normal output of 300 million pounds; lead fell from 31,250,000 pounds (1920) to 20,275,000 pounds. It is now certain that the outputs of copper, lead, and zinc will be much enlarged during the current year. The copper output is expected to approximate 200 million pounds.

Arizona's copper output during the year 1921 was 185 million pounds. That for the year 1920 was 558 million pounds. It is probable that the figures for 1921 will be exceeded this year. The larger smelters are working steadily at moderate capacities. The State produced gold to the value of $2,930,303; silver, 2,461,393 ounces; lead 6,511,143 pounds; and no zinc.

The metal output of the State of Utah during 1921 was valued at $22,023,270, which amount was less by $49,744,331 than the value of the 1920 output. The gold and silver production of 1921 fell off only comparatively little, but copper and lead showed pronounced decreases. Copper output in 1920 was 117 million pounds; in 1921, only 31 million. There is now a very decided revival apparent in metal mining.

Gold production in Nevada has decreased steadily since 1910. The output of the State for the year 1921 was $3,312,757 which was $253,971 less than that of the previous year. Activity is now increasing materially after months of idleness. Silver mining is improving rapidly. The copper output of the State for 1921 was only 11 million pounds as compared with nearly 51 million pounds for 1920.

According to the latest reports of the United States Geological Survey the gold mining industry of the State of California is showing improvement. The output of gold for the first six months of the current year amounted to $7,721,258, or $371,140 more than that of the corresponding period of 1921, but still considerably less than that for the first six months of 1920. The increase comes most largely from the gold dredges, copper, lead, and zinc mining are not in good condition.

Coal production during the fourteenth week of the strike fell to 3,959,000 tons. It is estimated that the fifteenth week—July 10-15—will be still lower.

The International Nickel Company's annual report of operations for the year ended March 31st, 1922, shows that the year's loss amounted to $797,746.93. Not since the year 1904 were sales so small. Nickel sales were only 40 per cent. of those of 1921 and sales of Monel metal only 66 per cent.

Exports of refined copper from the United States during the month of May totalled 58,085,033 pounds. Germany was by far the heaviest buyer, taking about 20 million pounds. France came next, purchasing somewhat less than 11 million pounds. Japan was a heavy buyer of zinc, taking seven and a quarter million pounds.

Europe

The general strike of metallurgical workers in Italy does not promise success for the strikers. Many of the employees of important plants have refused to obey the strike order. Late in June rumours of a satisfactory settlement of differences between employers and workers were current.

Certain oil wells, near Pechelbronn, Alsace, owned by the Germans before the war, were sold in March 1919 by their former German owners to a Swiss Company. The French Courts have set aside the sale for the reason that all German possessions in Alsace were sequestrated under the Treaty of Versailles.

German imports of iron and manganese ore for the first four months of 1922, amounted to 3,110,177 tons. Imports of pyrites totalled 249,180 tons.

Experimental work in the production of aluminum nitride is attracting attention in France. The action of a current of nitrogen on bauxite at 1,500 deg. in the presence of carbon, produces the nitride. The nitride is decomposed in a soda solution, forming ammonia and sodium. The major difficulty to be overcome is that of the design of plant.

Asia.

Important iron ore deposits in South Manchuria were discovered in the course of surveying the route of the South Manchurian Railway in 1909. During the war the Japanese investigated these deposits. As a result two 250 ton blast furnaces were built in 1919. The ore is stated to be low grade hematite.

The profits of the Burmah Oil Company, Limited, amounted to £3,150,000 for the year 1921.

A charcoal blast furnace has been put into [illegible] at Bhadravati, Mysore, by the Mysore Distillation and Iron Works, a subsidiary of the Tata Iron and

Steel Company, has a capacity of 60 tons of pig iron per day. The ore used is principally a high grade hematite 61 to 62 per cent. iron, carrying 0.05 per cent. phosphorus. By products from destructive distillation of wood will amount to about 200,000 gallons of crude methyl alcohol and 2,000 tons of lime acetate per annum.

The Report of the Railways Administration of India points out that India is about to undergo radical political and economic changes. Several great mining and metallurgical projects are being organized. Their success will in every case depend largely upon proper transportation facilities. Improvement in the railway management is, therefore, very strongly urged.

Figures relating to India's output of coal in 1920 are now available. The total tonnage raised was 17,962,214 tons. Exports amounted to 1,228,408 tons, imports to only 39,727 tons. Manganese ore outputs were 736,439 tons, of which 711,424 tons were exported. Tungsten ore outputs were 2,346 tons; chromite, 26,801 tons; magnesite, 14,346 tons; tin ore, 42,353 cwt., Copper ore, 28,167 tons, and bauxite, 3,931 tons.

The coal mines of China produced 18,670,000 tons of coal during 1920. Of this total, 13,900,000 tons came from North China.

During the month of May the production of crude petroleum by the British Burmah Petroleum Company and the Rangoon Oil Company was 74,434 barrels.

Africa.

The effect of the "gold premium" payments on the gold mines of South Africa is well illustrated in the case of the Crown Mines, Limited. The company's output of gold in 1921 brought £691,002 in premiums. Without this amount, with gold at its standard price, the operating loss alone would have been £19,000.

Southern Rhodesia's gold output for the month of May was 53,920 ounces; silver, 15,717 ounces. Chrome ore production amounted to 5,503 tons and asbestos to 828 tons.

Careful control of sanitation and hygiene amongst the native workers on the Rand has reduced the mortality rate to a very low figure. One company, the Rand Mines, Limited, which employs some thousands of Kaffirs, reports a mortality (not accident) rate of only 11.18 per 1000 for the year 1921. The intravenous injection of raw orange juice has been found particularly efficacious as a cure for and a preventive of scurvy.

Since the ending of the strikers' rebellion nearly 32,000 native labourers have been added to the payrolls of the Witwatersrand gold mines.

BRITISH COLUMBIA LETTER

A. M. Manson, Attorney General; Dr. W. H. Sutherland, Minister of Public Works; E. D. Barrow, Minister of Agriculture; and F. C. Wade, Agent General in London, Eng., all British Columbia officials, have returned after touring the mining sections of Portland Canal and other northern districts. Mr. Wade is collecting a new and representative exhibit of the minerals of the province for show in England. A prominent place will be given the ores of the Premier Mine.

Dr. J. A. Bancroft has resigned the position of Assistant Manager of the Granby Consolidated Mining & Smelting Co. and is being succeeded by Mr. L. R. Clapp, who is reported to have a wide experience in copper mining in America. Dr. Bancroft is returning to the faculty of McGill University as a professor of geology.

David Cole, an officer of the Cananea Copper Co., Arizona, has been visiting British Columbia.

H. Foster Bain, director of the U. S. Bureau of Mines, passed through Victoria recently after visiting Juneau and other Alaskan points. An inspection of coal deposits and examination of mining conditions generally were the chief objects of his visit to the northwest. He is en route to Washington.

Charles F. Law, a mining broker, has taken up fifteen leases on Big Valley Creek and fourteen near Antler Creek in the Cariboo District. He states that there is more valuable ground in the old channels of former drainage systems in the vicinity of Barkerville than in any other part of the Province as far as is known from present information.

The Cedar and Spanish Creek sections of the Cariboo are being made more accessible by road construction which has been initiated by the Provincial Government this year. One of the most important pieces of work is the building of a connecting link between the mouth of Spanish Creek to Duck Creek, a distance of seven miles. This will bring Quesnel Forks into touch with Keithley Creek by way of Cedar Creek. It will be appreciated by operators in the newly opened fields of Cedar and Spanish Creeks, as well as by prospectors, as a large stretch of territory will thus be made easy to reach and to explore.

Forest fires on the south fork of Kaslo Creek have destroyed the surface equipment of three mines, namely, the Gibson, Silver Bell and Silver Bear. The total loss is placed at $30,000. The Cork Province and Index Mines are in the path of the flames.

The Gamble Mining Co., hydraulic operators, Wild Horse Creek, claim to have discovered an old channel from which coarse gold is being recovered. There is 1,000 feet of this ground to be worked. New flumes have been built and other modern hydraulicking machinery installed.

Ore shipments to the Trail Smelter, Consolidated Mining & Smelting Co., for the second week of July totalled 6055 tons. Of this independent properties contributed 1242 tons, the remainder, 4813 tons, coming from Company Mines.

An aeroplane has been taken to Smithers, on the line of the G. T. P., northern B. C., to take miners and prospectors into the northern parts of the Province. A number of important mineral deposits have been reported by Indians and some white mining men in this region, and a party of explorers has arranged to inspect the discoveries. They will take the air route, covering ground in hours that ordinarily would take weeks. This will be the first occasion on record that prospectors have been transported by air.

The Transvaal gold output for June 1922 amounted to 675,697 fine ounces, as compared with 639,786 fine ounces for May 1922 and 678,490 fine ounces for June 1921.

Notes From Nova Scotia

The Demand for 1921 Wages

Since November last, the coal industry of Nova Scotia has passed through a period of depression and agitation and is still disturbed. In the early months one sensation followed another so rapidly that at the last the public was ready for almost anything. Two Conciliation Boards, both dealing with the same case, were called and two similiar awards given, only to be turned down. "Striking on the job" followed, with ill success but with much hardship to the miner and his family. This policy on the part of Secretary J. B. McLachlin led to strained feelings between himself and other executive officers and for a time it looked as if a permanent rupture in the organization had taken place. There are those who believe that this rupture does exist and may yet show itself in open division when the O. B. U. adherents see their opportunity. The Truro Convention ended in a struggle between the Reds and Moderates, with the Reds on top. Disloyalty to officers at that convention caused the resignation of the majority of them, and all the others soon followed suit. An election is now taking place and about the middle of August new officers will take their positions. But none of these things, not even the looting of the company stores nor the violent language of Secretary McLachlin towards the Prime Minister of Nova Scotia and the Minister of Labour at Ottawa, came with such a shock as the resolution passed at a mass meeting last Sunday calling on the different Locals to strike unless the Dominion Coal Company paid the 1921 wage rates. These were the peak of war-time wages, and since last November all the executive officers placed themselves on record as being favourable to the MacKinnon Award, which permits of a fairly large reduction in wages.

Strike Orders From The United States

This sudden change of front came as a result of a visit of international board member Barrett to Washington to consider the offer of President Harding to the United Mine Workers and operators. It was understood last fall that District 26 had full authority to negotiate a separate agreement and that it would not be involved in the struggle which is now taking place in the coal industry across the border. This was not a privilege granted the Nova Scotia members but was simply the fulfillment of an agreement entered into between the coal operators and the U. M. W. of A. when it was first recognized and given the check off in Nova Scotia. The text of the agreement was "that American conditions would not be permitted to influence Nova Scotia Miners in the making of wage agreements." It was then recognized that there was a great difference between the conditions of coal mining in the United States and Nova Scotia. Natural conditions were unfavourable to Nova Scotia coal mines. This agreement worked very pleasing to the public at large, who had grown tired of a long war between the miners of Nova Scotia as members of the U. M. W. A. and those who were opposed to them. But there were many who were not included by the settlement that had been reached and who felt that a time would come when this agreement would be torn to shreds and cast aside as worthless. That time has come and the agreement is a thing of the past. The miners of Nova Scotia are being asked to do as the miners of the United States, either to enter into an agreement or come out on strike. When the resolution to strike was passed last Sunday after a statement made by the board member Barrett, there was not one member to stand up and remind the fifteen hundred men present that they were repudiating their agreement and were running the risk of losing both recognition and the check-off.

Mr. Barrett stated that he had returned with instructions from President J. L. Lewis, that the miners of Nova Scotia would not be permitted to work without an agreement. He further stated that the coal operators of the U. S. were weakening, that a serious division in their ranks had occurred, and that the miners were winning the strike. Forty-seven per cent. of the American operators now favored the 1921 wage scale, he stated, and others would rapidly follow. He went on to state that if the miners won out and the operators of Nova Scotia failed to come to terms, that all the resources of the International would be placed at the command of No. 2 district, and that if a strike occurred, free distribution of the funds would take place. He pointed out that in some of the larger districts ten thousand dollars per week was being distributed and other districts were receiving whatever help was necessary. Some districts had so far carried on without funds and he felt sure that the United Mine Workers were riding to victory. He declared himself in favour of a strike if the 1921 wage rates were not granted.

Baxter Changes Sides

President Baxter followed the lead of Barrett and came out on the side of an agreement or a strike. The miners, he said, had repeatedly refused to sign an agreement and there was nothing left to do but strike. This was his policy at the convention at Truro and he had not changed.

J. B. McLachlin stated that he was not so sure that the United Mine Workers could win a strike just now. He favoured strikes when many ships for coal lay at the pier, and although he did not say so, he left one to infer that men should work in the intervals, but if McLachlin's advice followed there would be no intervals and hence no work. A large number of the workmen drew the inference that he favoured the I. W. W. tactics and he was ready if the opportunity offered, to apply it through the organization of the United Mine Workers, or if that failed through the O. B. U. He said that the winning of a strike depended upon two things, the time and the spirit to win.

Vice-President Delaney was more moderate and seemed to be the only member of the executive who had not changed his views over night. He received a splendid hearing while Barrett and Baxter were often interrupted. This showed that a great many men in the meeting were moderate in their views although the majority, mostly young men, favored a strike.

District Member L. MacCormick talked of revolution and was applauded to the echo when he referred to the refusal of President Harding's offer of a commission to the United Mine Workers as a means of settling their dispute. He evidently wanted to go one better than J. B. McLachlin, who said that every man should be withdrawn from the mine if a strike occurred. MacCormick reminded some of the audience of what they had learned at the Western front and hoped that they would profit by that experience when the time for action came. And here let me say that although quite a young man, MacCormick never saw the western nor any other front where real fighting had to be done.

Moderate Leaders Adopt Red Tactics

To say that the situation is serious is putting it mildly and although those who claim to be on the inside may try to make themselves believe that this meeting was put on for election purposes, the truth is that the former moderate leaders are now making a desperate effort to outrival the Reds, as a means to regaining the favour of the workmen. This is playing with fire, and the industry will suffer because of it. Men cannot be incited to strike and incensed to revolution without dire consequence. They cannot sow the wind without reaping the whirlwind. Nova Scotia miners are now sowing, and a reaping time may be nearer than they dream of. With over three hundred thousand tons of last winter's coal in the stock piles representing part of the wages paid out to workmen in the winter months, and with a coal output now reaching fourteen thousand tons per day with large contracts made and vessels in port to make delivery, it is not a time to make threats on life and property and to attempt to dislocate business. Cape Breton miners should not forget that winter comes to them as to no other part of the American continent. They must remember that their harvest time comes in the summer months and if these are let pass without making the most of them, a long, idle winter awaits them because they destroyed the only chance for shipping coal that comes to their Island during a few short months of the year. The American miners are not so situated. They have no such seasonal difficulties, they have no waterways like the St. Lawerence, closed by frost to navigation for five months in the year, no stocking of coal needful to facilitate shipping. Their markets are accessible all the year round and the extra expense of preparing for a summer's rush of coal delivery is entirely unknown to their trade. In their sober moments Cape Breton miners do not forget these things; but these times of quiet thinking are becoming rarer as discord is fomented and discontent encouraged with the open and avowed purpose of overthrowing the present social system.

Moderates Have Now No Leaders

Leaders like Baxter, round whom the moral forces of the Province have rallied, cannot side-step principle without loss of their following, of force and of character. Moderate men who think deeply find that they have now no leader, no one to represent their views, and are at a loss to know what to do. One thing they will not do, and that is to follow leaders who wobble. The present crisis may find these inactive and passive who otherwise might be the deciding factor in a double contest, the result of which none may foretell with certainty.

Had the International kept its hands off Nova Scotia as it had promised to do, or had the moderates stood their ground and remained true to their principles, the coal industry of the Province, which was well on the way to recovery, might have been safeguarded. The collieries have reached the highest mark since war reduced the output, and shipping last week exceeded all previous records. Miners were settling down again to do a day's work and prospects for the remainder of the year were bright. It would be deplorable that, just when coal trade and all other business throughout the Province was beginning to pick up and show signs of regaining lost markets, there should be a set-back by reason of labor disputes and threatened strikes.

There may be a way out, but "where vision is lacking the people perish." And when in place of sane leaders with a respect for law and order, we have men who can do nothing but strut across the stage and bellow like mountebanks to make the light-headed believe they are earning their salaries, there will never be anything but trouble. If organized labor expects to enjoy public confidence and have public support, it can only come through able and wise leadership and a due regard for the public welfare.

NATURAL GAS SUPPLY OF ONTARIO

During the last few weeks numerous applications have been received by Lieut-Col. R. B. Harkness, Natural Gas Commissioner under the Ontario Government, from the localities supplied by natural gas for permits to use gas as a substitute for coal under boilers and in various other ways, on the ground that coal is unobtainable, and also that its present price is prohibitive.

The Commissioner points out that the essence of the law regarding natural gas is to conserve the supply as far as possible, for domestic cooking and heating, and the same shortage of fuel is, and will be felt by the householder as by the manufacturer. In fact, householders by reason of this shortage, will undoubtedly place more dependence on natural gas for heating during the coming winter than they did last winter, and if the gas fields are taxed to their utmost during the late summer months, the gas pressure will be so lowered that it will very seriously affect the available supply during the early winter, when there is barely enough to meet the ordinary demand.

For this reason, as well as because the remaining supply will probably last only a few years longer, and it is imperative to keep it for domestic use mainly, it will be impossible to grant these requests for temporary industrial permits. Only one such permit has been granted to date, and that to a public utility that must be kept in operation.

If coal cannot be got, resort should be had to wood or oil.

Hans Renold of Canada, Limited, 11 St. Sacrament St., Montreal, manufacturers of Renold's Chain Drives, have just issued a very attractive, interesting and instructive booklet entitled, "Erection and Maintenance of Renold Chain Drives", which they advise us they will gladly send to any reader of the Journal on request.

EDITORIAL

When I had perceived the various parts of the subject, [mining], like so many members of the body, I became afraid that I might die before I should understand its full extent, much less before I could immortalize it in writing. — Georgius Agricola — 1550. (from Hoover's translation.)

GREETINGS!

Members of the American Ceramic Society will be on a tour of inspection throughout the region north of Lake Ontario and the St. Lawrence during the week of August 13th. They will be, on occasion, the guests of a number of Canadians interested in the ceramic industry, and will inspect numerous Canadian plants and feldspar quarries. The *Canadian Mining Journal* adds, to that of the official hosts, its welcome to our visitors. We leave further words of guidance and advice to the inspiration of the Journal's poet.

THE CANADIAN FELDSPAR QUARRIES

For the last quarter century there has been a consistent annual production of feldspar from Canadian quarries, fluctuating with the demand, to be sure, but sufficiently steady and of such quality as to draw the attention of users of feldspar throughout the continent. One of the original producers, the Villeneuve quarry in the Ottawa district, still furnishes annually the few tons of that exceedingly rare feldspar required by the dental trade. The Richardson quarry, which inaugurated the fame of Canadian feldspar and provided a large part of the tonnage exported until quite recently, is again being made ready to ship. Meantime "Buckingham" 'spar from the Derry quarry, near Ottawa, is upholding the reputation of Canadian 'spar by virtue of a deposit of unusual purity and fair size.

A host of small quarries throughout eastern Ontario and western Quebec have added their quota to the Canadian production, many of them maintaining the standard set by the leaders, though others (it must be confessed) have shipped material that tended to bring all but the steady producers into disrepute. Indeed, during the war time this practice of shipping an inferior grade of feldspar, useful only for the crudest varieties of pottery, became so prevalent as to make the users justly suspicious of any feldspar of Canadian origin. We are confident that now, with the consistent production of "Buckingham" 'spar, and with the promised re-opening of the Richardson quarry, "Canadian" grade will continue to signify, as heretofore, the best feldspar obtainable on the continent.

While we have stressed, above, the importance of the principal producing feldspar quarries, we do not wish to exclude the lesser producers from consideration, or to suggest that even unproved prospects are not important. Far be it from us, for even we, the editor, have a feldspar prospect about which we shall say little until we have shipped a cargo or two! Among the hundreds of feldspar-bearing dykes that have been opened up, some scores have produced a carload or two each of feldspar, good, bad or indifferent, and a few dozen have attained to the production of a few hundred or a few thousand tons; but one can count on the fingers of one hand the feldspar quarries whose size has rendered them capable of the consistent shipment of large amounts of merchantable feldspar annually. It is from this last variety of quarry that all users of feldspar wish to draw their supply; and we are confident that further exploration and careful, consistent operation of the deposits thus discovered will ensure for many a year to come a constant and large production of feldspar of "Canadian" grade.

THE GEOLOGIST AND THE PROSPECTOR

More and more are those two pioneers of the mining industry, the geologist and the prospector, coming to realize not only their common aim, but their interdependence. It is not difficult to understand that the object of both is, in essence, the same, and it is easy to see that a geological survey can aid a prospector materially in his search for ore; but it is somewhat more difficult for the geologist to realize that, as his own work is not immediately or directly productive of profit, he must justify the expenditure his work incurs by means of the aid he gives to the mineral industry, principally through the agency of the prospector.

It is fortunate that the present generation of Canadian geologists have a very clear conception of this relation. Continually we have this exemplified. The prospector has come to look upon the geologist in the field as guide and friend. There is, more than we know, a transference of information and ideas round the camp fire or on the trail between the two, and both are free to acknowledge the mutual benefit. Our geologists are, almost to a man, accomplished woodsmen and mountaineers, and this adds not a little to the regard in which they are held by their fellow pioneers.

As a means of educating the prospector in the scientific

aspects of his work, this personal contact with geologists in the field is of great value. Unfortunately, such meetings are, in the main, fortuitous and of short duration, so that the prospector can gather only fragments of geological lore. The geologist's written report is the place where the prospector must look for most of his information.

On another page we point out two instances in which the geologist has given specific information and a useful "tip" to the prospector. Dr. T. L. Tanton, in his report on a part of Thunder Bay district, Ontario, points out actual occurrences of molybdenite and galena, as well as certain geological features that are worthy of careful investigation. This area, in which he is the first official explorer, has not been prospected, and he considers it worth prospecting.

The second instance is furnished by Mr. T. T. Quirke, in his report on the Wanapitei Lake map-area. After a study of the known occurrences of gold in the vicinity, Mr. Quirke is ready to endorse the conclusion of other geologists who have examined them, and goes on to point out to the prospector a number of fault zones, close to diabase intrusions, that have not yet been explored and are worthy of close attention.

From time to time the *Canadian Mining Journal* has recorded instances where the "tip" of a geologist to a prospector has resulted in the discovery of a valuable mineral deposit. Such instances occur much oftener than they are recorded.

An unfortunate feature about the hints to prospectors given in written reports, and not spoken directly, is that they often fail to reach the men for whom they are intended. The *Canadian Mining Journal* will take occasion to transmit this information as consistently as possible, through its pages.

PURE FELDSPAR BY CONCENTRATION?

There is readily available in numerous parts of Canada a very large supply of feldspar that is at present useless on account of its being contaminated with dark minerals such as black mica, magnetite, pyrites and tourmaline. Comparatively little consideration appears to have been given to the possibility of eliminating these impurities by means other than hand cobbing.

Today we review the report on "Radium-Bearing Pegmatites in Ontario," by Mr. H. V. Ellsworth. The radium-bearing minerals occur in pegmatite dykes (the principal source of feldspar) and are objectionable impurities to the ceramic manufacturer. In the Orser and Kraft feldspar quarry, near Maberley, Ontario, there occurs, disseminated through the 'spar, the radium-bearing mineral euxenite. A hand-picked lot of feldspar, rich in euxenite, was shipped to the Mines Branch, Ottawa, where it was crushed and concentrated. From 1,593 pounds of this euxenite there was recovered over 55 pounds of euxenite concentrate.

This concentration test, made for the purpose of recovering euxenite from feldspar, suggests the possibility of treating impure feldspar after grinding, in such a way as to eliminate objectionable impurities. If such a material can be treated as above, to recover a large part of the heavy mineral, it seems quite possible that it can be successfully treated to save the bulk of the light mineral, feldspar, free from any but a trace of impurity. The means are at hand, in the laboratories of the Mines Branch, Ottawa, to conduct an investigation into such a process, provided both feldspar operators and the metallurgists of the Mines Branch consider that the chances of success warrant the experiment.

We believe that Mr. Ellsworth's suggestion is worthy of serious consideration.

A NEW USE FOR FELDSPAR

For half a century past, researchers have been attempting to find an economically feasible method of making the potash of feldspar available for human use. All the multitude of processes tried out up to the present have failed of commercial success. Nevertheless, the reward of a successful issue would be so great that attempts are still under way, and eventually a process capable of successful operation is certain to be evolved.

Most of the processes tried out are foredoomed to failure because they aim at the recovery and use only of the potash in the mineral—at best 13 or 14 per cent. of its bulk. It can be safely postulated that the successful process must provide for the use of at least the major part of the feldspar. A commercially pure potash feldspar will contain, let us say, 65 per cent. silica, 18 per cent. alumina and 13 per cent. potash, the remainder being mainly soda. If we are to make use of the major part of the 'spar we must use this silica.

A short time before he died, in 1920, J. E. Johnson, Jr., the eminent American iron metallurgist, applied for patents that described the manufacture in the electric furnace of ferro-silicon from potash feldspar and scrap iron, the potash to be volatilized by the extreme temperature of the furnace, and the fume caught and condensed. Now we hear of a similar, but simpler, process, said to be in actual operation in Sweden. Ferro-silicon is made from the same ingredients, but the potash is not volatilized and remains in the slag in combination with the alumina and other slag-making ingredients of the charge. This slag, from which the potash is readily dissolved, is ground and applied directly to the fields as fertilizer.

If a process such as this is actually feasible, it presents an excellent opportunity to Canadian manufacturers of ferro-silicon. There are very large bodies of potash feldspar readily accessible along navigable water routes as well as along existing railways. As electricity is already the source of power used, no radical change in the present method of manufacture would be necessary.

The reputed successful operation of this process in Sweden may point the way to one more Canadian industry, well founded on our mineral resources and our cheap hydro-electric power.

A STANDARD FOR FELDSPAR

For a number of years past, and more particularly since Mr. Raymond B. Ladoo made his investigation recently for the Bureau of Mines, at Washington, and pointed out certain avoidable anomalies in the feldspar mining of the United States, there has been a tendency among those interested to strive for the standardization of material that has been of such incalculable benefit in certain other of the mineral industries. The movement among Canadian feldspar producers has not as yet gathered much momentum; but it already exists, and will appeal to all rationally-minded operators if the case is presented in a proper light.

The analogy with iron ore will serve to demonstrate the benefit accruing to miner and manufacturer alike from a standardized product — a definite standard or series of standards to which the miner known he must conform if he is to continue to hold his market, and on which the buyer of ore knows he can depend. All iron ore from the great Lake Superior field is now blended to produce certain standard grades, and these grades are ordered by the blast furnace operator in the proportion in which he desires them, irrespective of the particular mines from which the ore has been derived. This simplifies the problem of both the miner and the buyer of ore, and in no way restricts the initiative or independence of either. Nor is there any monopoly in the production or handling of this ore. There is simply a set of standards, adopted by common consent as a matter of convenience and economy, to which all *bona fide* dealers in ore must conform.

A similar move can, and will, be made by those interested in feldspar. It is not likely that any blending of the products of different quarries will be needed in this case; but grades as required by the trade must be specified sufficiently clearly to prevent misunderstanding, and substantial producers must band themselves together for the purpose of forcing an adherence to these grades. This will not only react to the benefit of miners and manufacturers in general, but will aid every honest prospector, promoter and operator of feldspar properties to attain the end he desires.

EDITORIAL NOTES

A correspondent writes of a trip, just ended, through the Gondreau field as follows: "Finds are few and far between. West of the track there has been nothing more "turned up at all, the Murphy being the only property "with any kind of a showing that I have seen or heard "of. East of the track X— has been doing sampling on a "property that shows great promise. He is much pleased "with the results so far, and thinks the property has a "good chance of becoming a mine. The prospectors, of "course, think it is a mine right now." This is typical of letters and conversation among mining men, not only about the Gondreau district, but about any "rush" district. Those who know the mining business are not in danger of becoming enmeshed in the net of over-enthusiasm, or engulfed in the whirl pool of a "rush". The unsophisticated public is in need of all the guidance it can get from those who know the actual conditions of such a case. The truth cannot injure a good prospect, and it will prevent a deal of fraudulent manipulation.

Today we publish a letter from Mr. Paul Ginther of El Paso, Texas, referring to a discussion of his "Adargas" mine promotion by Mr. Alexander Gray. Mr. Gray has advised Canadian investors not to put their money into this Mexican promotion. Without entering into a discussion of the merits of Mr. Ginther's mining property, we can endorse, without qualification, Mr. Gray's advice. We have enough, and more than enough, promising prospects, near-mines and mines in Canada to engage fully the attention of Canadian investors, without recourse to speculation in far-off Mexico. Still, Mr. Ginther has a right to present his case in these pages, since his project has there been the subject of adverse criticism.

THE EXCURSIONISTS' GUIDE

(Next week Canada extends a welcome to a large number of the members of the American Ceramic Society. In their honour and for their guidance, the *Canadian Mining Journal's* unrivalled rhymester submits these limpid lucubrations. The Society's itinerary includes Montreal, Ottawa, Kingston and Toronto.)

As now you leave your own, your native strand
To travel in a strange and foreign land,
I beg to warn you that the broad St. Lawrence
Is not the only thing that flows in torrents
Within the limits of old Montreal
I hardly think so — rather not at all!
As Montreal is your first point of visit,
It's not unfair to warn you people, is it?
And saying this, I'll now dismiss the topic,
Or else you'll fancy that my eye's myopic

* * *

Your welcome by the Province of Quebec
Will be exceeded nowhere, no, by Heck!
Yet Ottawa will do her best to show
That she is not so everlasting slow!
Kingston is Kingston, Princess of the Lakes,
Mostly asleep, but charming when she wakes —
She'll give a welcome rousing and dynamic
To one and all concerned with things ceramic
Toronto, in her conscious strength and pride
Will throw her portals hospitably wide,
And even there in that stern home of virtue,
Unhesitatingly we do assert you
Will find a true, a wondrous compensation
For Volstead's Sin against your tree-born nation!

XNON

The Richardson Feldspar Quarry

By J. C. MURRAY

About five-sixths of all the feldspar shipped from Canada to the United States during the last twenty years has come from Frontenac County, Ontario. The greater part of this five-sixths, in fact nearly all of it, has been derived from the Richardson quarry, which until recently was Canada's only consistent producer. For the last three years the quarry has not been operated, for reasons that will be mentioned hereunder.

History

The quarry was opened by the late Senator Richardson, of Kingston, in the year 1901, and was operated continuously until the year 1918, when it was acquired by its present owner, Mr. R. T. Segsworth, of Toronto, barrister, who was associated with his brother, Mr. W. E. Segsworth, M.E., in the brilliant and profitable development of the Seneca-Superior mine at Cobalt, and was then and there inoculated with the virus of mining.

In the year 1901, and throughout the succeeding decade, although feldspar prices were low, labour was exceedingly cheap. Skilled labour was not deemed necessary to the working of the quarry, and ordinary workers could be had for less than $1.50 per day, sometimes much less. The feldspar was—as it still remains—singularly pure, little cobbing was required, and both summer and winter hauls to the Kingston and Pembroke railway, though impracticable now, were then feasible, because $3, slightly more or slightly less, would pay for the day's hire of a team and driver.

In summer the 'spar was trammed a quarter of a mile to Thirteen Island Lake. Here the cars were loaded on scows and towed across the lake. Again the trams were pulley hauled across a narrow peninsula, again placed in scows, and finally unloaded at Glendower, the end of a short spur running in from Godfrey Station on the K. & P. This series of handlings would today be paralysing. In those days it left but a small margin of profit.

A brief period of activity convinced Mr. Segsworth that transportation had to be improved. Accordingly he suspended work at the quarry, confined his local efforts to sorting over the dumps and grading the 'spar in stock on the surface, and began impressing the Canadian Pacific Railway authorities with desirability of extending the spur rail line to within two miles of the quarry. This has been begun. The connecting wagon road is being finished by the Ontario Department of Highways (Public Works). As this road is remarkably well graded, transportation costs will be reduced to a fraction of what they have been. Both the Ontario Government and the Canadian Pacific Railway authorities with the desirability of extending the non-metallic mining industry. The Canadian Pacific recognizes the freight producing possibilities of the industry; the Government recognizes its duty to the community.

Geology

The geology of the region is easily understandable in principle, hence it is all the more astonishing that save in one or two instances, no attention whatever is paid to it by operators, or, for that matter, by users of feldspar.

The Richardson feldspar deposits is a uniquely large, pure, lenticular body of spar enclosed in clean well-defined granite gneiss walls. The conditions under which the intruding pegmatite filled the huge gap were, obviously, highly favourable to complete segregation of its constituents. The intergrowth of quartz and 'spar, typical of graphic granite, and naturally a limiting condition as to potash content, is here evident only in narrow isolated zones, or, rather, in streaks, near the contact with the granite; in other words, the 'spar and the quartz have separated out from the original magma as individual mineral entities, and the quartz, therefore, is only a very incidental diluent of the 'spar. Mica is found only in

Present Appearance in Richardson Quarry

rare, easily avoidable, bunches. The other accessory impurities, tourmaline, hornblende and iron pyrites, are encountered so infrequently and in such small amounts as to be practically negligible. To quote the report of the Dominion Mines Branch (1916), the Richardson spar "is probably the purest grade of commercial 'spar quarried anywhere, and has undergone only the crudest hand sorting at that."

From the evidence of surface outcrops, the recurrence of similarly large lenses of feldspar can be assumed as highly probable. In fact the geological sections at the northerly and southerly extremities of the pit and in the bottom give very strong warranty for this assumption.

The spar itself is a pinkish microcline shading to a dark buff red. It is commercially pure, and has for years been the high grade standard for the continent. No other spar has approached it in consistency of chemical and physical qualities. The dyke proper is about 150 feet wide and has been worked to a depth of about 100 ft. for the length of the pit, approximately 400 feet.

The Pit and the Stock Piles

The main pit, which is the only working from which feldspar has been quarried, is as stated above 400 feet long by about 150 feet wide, the width being fairly uniform except at the northerly and southerly extremities. From this excavation, with inadequate handling facilities, there has been taken out a total of about 500,000 tons of material, of which approximately 250,000 tons was spar, mostly of the grade that made the Richardson famous. The remaining 250,000 tons of material, disposed in stock piles on the surface, requires sorting.

The quarry bottoms in high-grade spar. An inclined shaft sunk to a depth of 40 feet below the lowest working is also wholly in spar of the best quality. The phrase "ore in sight" has little application to feldspar quarrying as heretofore carried on. Every quarry, without exception, has suffered from the most virulent form of the "hand-to-mouth" disease. The survival of the Richardson has been due wholly to its exceptional magnitude and to the purity of its spar.

Dump at Richardson Quarry, now Being Worked Over

With the guidance of past records and the results of trial shipments, the contents of the run of mine dumps and the stock piles may be estimated at 250,000 tons, consisting of spar, mixed spar and rock, and quartz. These dumps constitute a reserve of spar representing about 50 per cent of the whole. Hand sorting is practicable. The installation of simple mechanical equipment will greatly cheapen and facilitate the handling of this available reserve.

Much of the quartz quarried with the feldspar is sufficiently pure to be shipped. Some hundreds of tons are now sorted on the surface. The unsorted stock piles will yield, it is estimated, about 5,000 tons, the pit about 30,000 tons. Some years ago no less than 6,000 tons of pure material were sold to electric smelting works at Welland.

Power

Hydro-electric power will be provided for the whole of the region within a measurable time, as this is the policy to which the Ontario Government is irrevocably committed. Meanwhile the choice lies between using coal or fuel oil. At its highest cost power is not a determining factor in the situation. Transportation assuredly was operated to capacity until the inequities of the market shall have been corrected.

Market Conditions

It is Mr. Segsworth's intention so to develop and equip the property as to simplify grading and give uniformity to materials shipped. This is of as much interest to the grinders and users as to the producer himself. Heretofore the utter lack of stable market specifications has been nothing less than a blight to the feldspar producer.

Without doubt the producer of feldspar is placed in a highly disadvantageous position when he attempts to secure a steady and fair market for his output. In the first place, there is no rational selling basis whatever. Spar that one buyer may approve of may be summarily rejected by another. About the only sane basis that has been suggested is that of setting a price rate of one dollar per unit of contained potash. This is open to criticism, but so also will be all suggested scales until producer and user alike call in the man of science.

Since the Richardson, because of its magnitude, has produced uniform grades, the market irregularities have not affected it so adversely as it has the smaller producers. But it seems certain that the Richardson will not be

Standardization Must Come

Feldspar producers in Frontenac and, indeed, throughout Eastern Canada, should be devoutly grateful to Mr. Ladoo, of the United States Bureau of Mines, for giving such timely publicity to the relations of producers, grinders, and users. As a direct result of his frank expression of opinion it is practically certain that Canadian shippers will hereafter be protected by independent sampling, and that they will know before shipping how closely their feldspar meets the chemical and pyrometric standards that will sooner or later be recognized by the trade. This will tend to do away with the present unsatisfactory state of affairs.

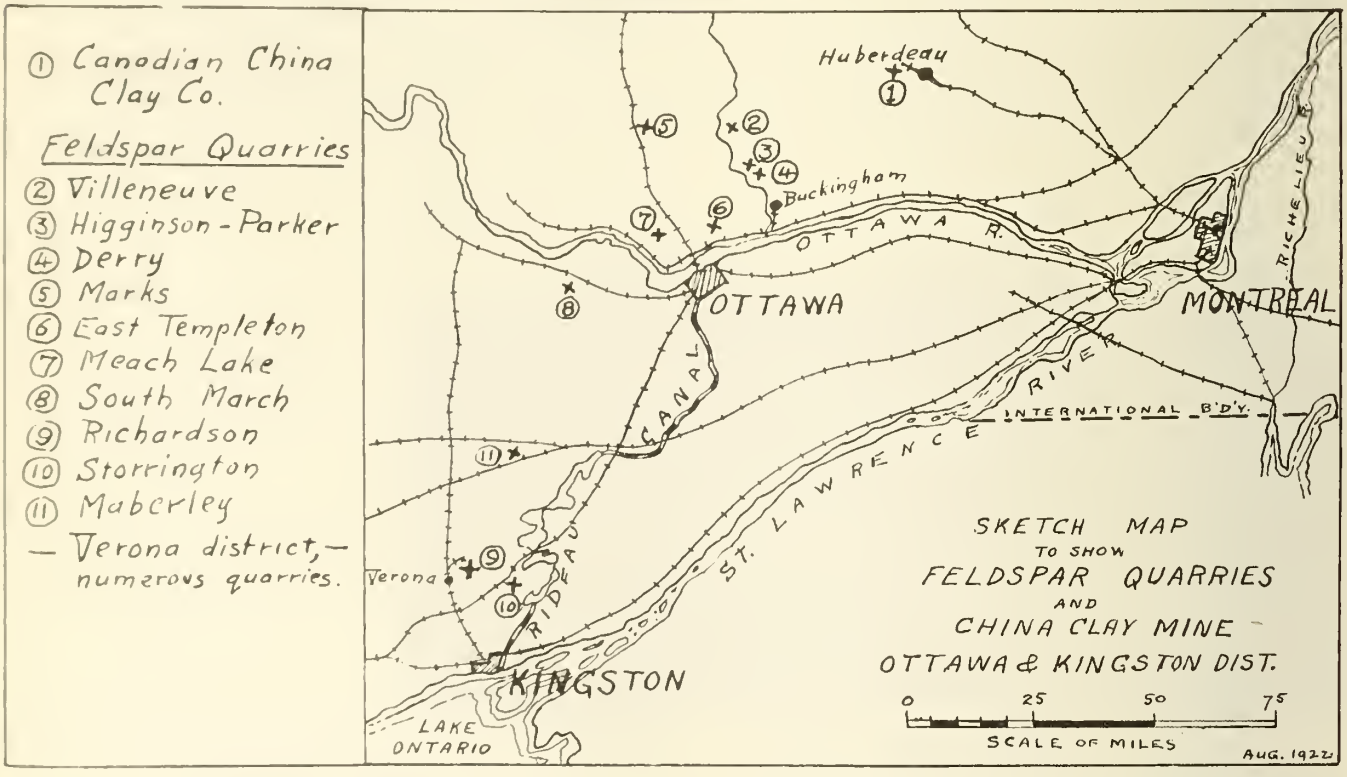
Conclusion

Postulating a sound working understanding between producers and buyers, there is no doubt that the feldspar deposits of Frontenac County, and of other accessible districts in Eastern Canada, will be worked profitably on an increasingly large scale. As in all such industries, the tendency will be towards the elimination of the small operator. Also it will be gradually borne in on the owners of grinding plants that the mining of feldspar requires specially competent and experienced men, and that it is an economic crime to attempt it without proper guidance.

A firmly established feldspar producing industry will encourage the expansion of many subsidiary industries.

Already many United States pottery manufacturers appreciate the advantages of the Verona district as a source of supply. In one or two instances manufacturers from the other side of the invisible boundary are seriously contemplating the erection of grinding plants in Kingston.

The keynote of the situation is an assured supply of good 'spar. Co-operation between all parties interested is the *sine qua non*.



VERONA DISTRICT

Throughout the territory accessible from the railway near Verona, there occur innumerable pegmatite dykes, many of them containing merchantable feldspar. During periods when there is a good demand for feldspar and when the price is correspondingly high, many of these deposits are worked, some of them consistently and economically. Some have produced feldspar of good quality in quantities measured by thousands of tons; but the characteristic deposit is rather small, with the chances against continuity of the grade that has put "Canadian" 'spar in a class by itself. Still, it is certain that the sporadic operation of such pits will continue to furnish a large tonnage of feldspar during periods of brisk demand, and it is possible at any time that the exploration incidental to such operations may disclose a deposit such as can form the basis of consistent mining operations.

Meantime it is particularly necessary in the case of these small operations that some uniform system of grading and classifying be adopted, both for the protection of buyers and for the direction of operators. Such a measure of standardization will, more than any other thing, help to make more consistent and more remunerative the production of small feldspar quarries.

FELDSPAR IN NORTH HASTINGS

About 75 miles north of Belleville, Ontario, in North Hastings county, a number of pegmatite dykes have been worked for feldspar during recent years. The principal producer among these up to the present has been the quarry of the Pennsylvania Feldspar Company, on lot 18, concession VII Monteagle township, 1½ miles east of Hybla station on the Canadian National Railway. The dyke of feldspar is 30 feet wide. During 1920 and 1921 it furnished several hundred tons a week of "Canadian" 'spar to the grinding mill of the company in Rochester, N. Y.

The search for merchantable feldspar has been inaugurated in North Hastings only comparatively recently, and the geological conditions, as well as the actual dykes, disclosed during this comparatively brief period would suggest that the district is likely to become a consistent producer of feldspar with further development.

Feldspar Deposits of the Ottawa District

By N. B. DAVIS

Historical

The first shipments of feldspar from Canada to the United States were made from quarries operated in Templeton Township, some sixteen miles to the north east of Ottawa, in Quebec Province. These quarries were operated in a small way for a few years, and then closed down because of the high freight rates then in force to East Liverpool, Ohio, and Trenton, New Jersey. For the period 1896 to 1901, the output amounted to approximately 8,000 tons.

About 1906, the Electric Reduction Company of Buckingham opened a body of pegmatite located on a ridge one mile from East Templeton station. (See Sketch Map for locations.) A small amount was ground for Montreal consumers, but the means employed were not suitable to the ceramic trade, and work was suspended. Subsequently the property was taken over by the Eureka Flint and Spar Company and several thousand tons shipped to Trenton.

About the same time a deposit of high soda 'spar, located near Meach Lake in the Township of Hull, was prospected, and a small quantity shipped to Trenton.

White feldspar was produced regularly between 1884 and 1917 from deposits about 25 miles north of the town of Buckingham, and used by the dental trade. The first deposit opened was the Villeneuve Mine, but its chief value lay in the output of white mica.

About 1896 a shipment of 250 tons of ordinary pottery 'spar was made from Lot 14 B in the twelfth Range of Buckingham Township, but the quantity developed was not sufficient to overcome the transportation difficulties.

No further work was carried on with feldspar until 1918, when O'Brien & Fowler opened a quarry near South March station in Carleton County, 16 miles west of Ottawa. Shipments were made to Langhlin, Ohio, and Wheeling, West Virginia. The car shortage, coupled with an advance in freight rates early in 1920, resulted in the closing down of this property.

About the same time a dyke of white soda 'spar was opened near Marks station on the Gatineau Branch of the C. P. R., and shipments sent forward to the Ortord Soap Company, Manchester, Conn. Changing conditions, during 1921, resulted in the closing down of this quarry.

In the autumn of 1920, O'Brien & Fowler opened the quarry now known as the Derry, located on Lot 8, Range 1, of Derry Township, and developed a remarkable body of pure 'spar, uniform in grade and analyses. As a result of this successful operation, local people in Buckingham became interested in prospecting their properties and three of these are now producing in a small way.

Character of the Spar

In the territory west of Buckingham, the feldspar is mostly pink to red in colour, and the alkalies run from 12 per cent potash and 3 per cent soda to 6 per cent potash and 5 per cent soda, the higher soda 'spars being in the Gatineau region.

The dykes in the vicinity of the Lièvre River, north of Buckingham, carry 'spar that is cream to white in colour, and distinctly higher in potash and lower in soda than that farther west. Typical analyses show 12½ per cent. to 13½ per cent potash and 1.75 per cent to 2.15 per cent soda.

INDIVIDUAL DEPOSITS

Derry Quarry

The most outstanding deposit is the "Derry" Mine, operated by O'Brien & Fowler, and this is the property to be visited by the summer gathering of the American Ceramic Society. It is located on the east side of the Lièvre River valley, about 9½ miles north of the village of Buckingham and 2 miles from the river. The deposit is part of a large intrusive mass of pegmatite that can be traced across-country for some distance, with its greatest width and development of crystallization on the south end of Lot 8 in the first range of Derry township. The dyke at this point reaches a maximum width of 150 feet. The strike is a few degrees east of north, and the dip almost vertical. The easterly part of the dyke consists of intergrown feldspar and quartz with occasional masses of very coarse 'spar. The westerly 50 feet consists of a lens-shaped body of almost pure 'spar, 300 feet long. The hanging wall is gneiss, and the foot wall a normal pegmatite.

During the past winter crystals 20 ft. to 40 ft. long and up to 15 feet in diameter were encountered. One of

Camp at Derry Quarry, and North End of Feldspar Deposit

Derry Quarry, looking North into Open Cut

the most remarkable features is the low percentage of quartz; the actual tonnage taken out to date shows only 1.5 per cent.

Iron bearing impurities, such as tourmaline, mica, etc., are confined mostly in the wall zones, associated with large crystals and the soda 'spar, albite. The present opening is in the form of an open cut driven into the hillside, and no hoisting will be necessary for several years to come.

Pedneaud Dyke in Hill, 200 feet High

Great pains are taken to maintain the original purity of the material. The surface to a depth of 6 ft. or more is quarried separately to receive special attention and insure the minimum surface contamination. The wall zones are not taken out until the central part has been quarried, so that the cobbing is also reduced to a minimum.

Holes are drilled across the face to depths of 8 to 14 ft. and spaced 4 to 6 ft. apart, depending on the nature of the ground to be broken. Both straight and ammonia dynamite is used for blasting. In the pit each man uses a stone-fork with 5/8 inch. opening to eliminate the smaller sizes of rock. As it is loaded into one-ton flat dump cars, one or two men stand at each car inspecting the material. The cars dump into a 100-ton bin built on the hillside at the mouth of the pit, and the 'spar passes by gravity, as required, into waggon boxes or sleighs. In summer waggons carry it two miles to the river bank, where a special dumping device puts it into a chute of 40-ton capacity, from which it passes, by gravity, to the scows. The scows are towed to the railway siding at Buckingham, and the 'spar placed directly in cars or in stock on a plank platform. Hence, from the time the 'spar is loaded at the quarry until it is shipped, every effort is made to keep it scrupulously clean.

Representative analyses of the shipping grade is as follows:—

	A	B
Silica	65.09	65.80
Alumina	18.85	19.74
Iron	0.029	0.031
Lime	0.21	0.11
Soda	2.11	1.74
Potash	13.42	12.32
	99.709	99.741

The fine material under ½ inch is screened for buff stucco gravel, and is being marketed under the registered trade name of "Sparstone".

Higginson-Parker Quarry

About a mile due north of the Derry Mine, on Lot 9 of

Higginson-Parker Pit

the second range of Derry. Messrs. Higginson and Parker have opened up a small body of similar 'spar. The present opening measures 25 ft. by 50 ft., and the pit is about 50 ft. deep. A boiler and hoist are installed, and sinking is carried on with one steam drill. They are now making an interesting experiment, attempting to deliver the product to the railway by means of a ten ton Holt tractor hauling three trailers over a rather hilly road, a distance of 14 miles.

Pedneaud Quarry

One mile south of the Derry Mine another dyke of the same sort outcrops on the side of a steep hill. For a number of years the lower 75 ft. of the outcrop has been worked for quartz, but, during 1920, a fair spar show was located near the top of the hill and the output taken by O'Brien & Fowler.

There is more massive quartz in this deposit than in any yet known in the area, but the crystallization is on the same large scale.

Cameron Quarry

Recently a small body of 'spar has been prospected on Lot 12 in the seventh concession of Buckingham. At the time of writing, work had not advanced sufficiently to gauge its size properly.

Several other small bodies of pegmatite have been opened, principally for quartz, but the presence of excessive amounts of other impurities, such as pyrite, makes them of doubtful value.

A China Clay Mine

MINE AND MILL OF THE CANADIAN CHINA CLAY COMPANY AT HUBERDEAU, QUEBEC

Until recent years there has been in Canada no economic production of China clay, and deposits of the proper quality and in sufficient quantity within reach of adequate transportation facilities have been disclosed only during the last decade. These deposits are in the vicinity of Huberdeau, Que., 85 miles north west from Montreal by railway, or 70 miles in a straight line. The property at present being developed is at the terminus of a branch line of the Canadian National Railway extending from Montfort Junction on the main line to Quebec.

The locality in which the Kaolin occurs was examined in 1916 and again in 1918 by Dr. M. E. Wilson of the Geological Survey, whose report (Memoir 113 *Geology and Mineral Deposits of a Part of Amherst Township, Quebec*) describes fully the geology of the deposits and discusses their origin.

History

Kaolin or China clay was first reported in the district in 1895, when a sample was obtained from the bottom of a well. As there are few natural outcrops of rock in the vicinity, all being covered by a thick layer of glacial drift, prospecting is expensive and development has thus been retarded.

Ten years ago the Canadian China Clay Company acquired a large acreage of the kaolin bearing ground and erected a washing plant. Several thousand tons of China clay was produced under the original management. The management was changed and the plant altered, with less satisfactory result. Eighteen months ago a third management was inaugurated and the operations since then have been consistent and effective and promise to be not only commercially successful but to lay solid foundation for a Canadian China clay industry.

Geology

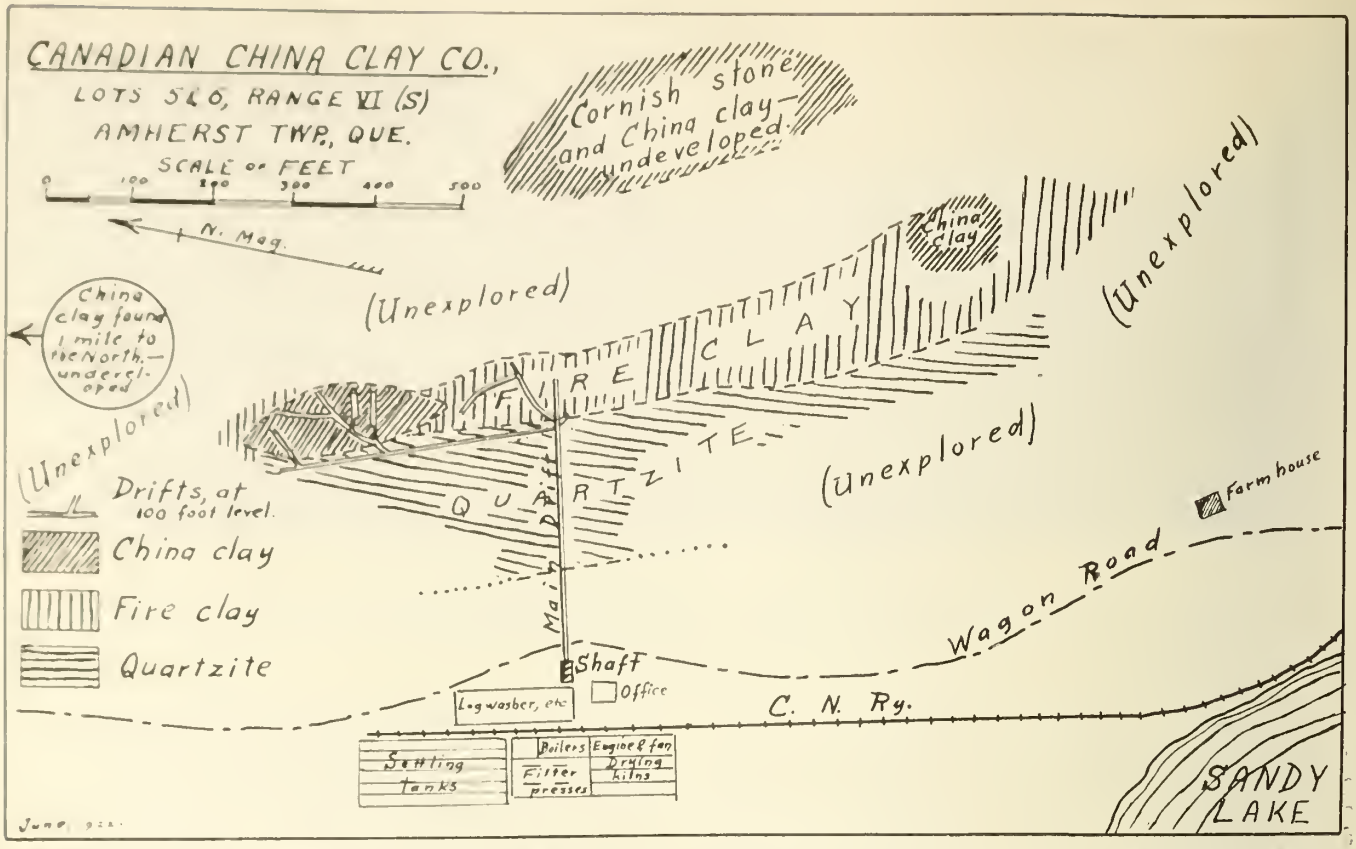
The deposits of China clay occur in quartzite rock of the Grenville series, the oldest series of rocks known to have a sedimentary origin and consequently one of the earliest to be formed on the crust of the earth. This quartzite was originally sandstone, and with it were associated beds of shale which are now changed to garnet gneiss. This garnet gneiss occurs in an irregular way throughout the quartzite, and as it is iron bearing, it introduces material that contaminates the quartzite and clay with rust. But there are zones that are free from the influence of this garnet gneiss, and consequently free from iron. The dip of the quartzite is vertical or nearly so.

The zone in which the kaolin occurs is about 1,000 feet wide, and is known to extend, north and south, for a distance of 7,000 feet. How far the zone extends beyond the limit, is not known. Comparatively little surface prospecting has been done to disclose what lies beneath the mantle of boulder clay that effectually covers the ground. The clay bearing zone is enclosed by a mass of intrusive granite, younger than the Grenville series, which provides a suggestion as to the origin of the kaolin deposits.

The Mill Buildings

Origin of the Deposits

As the China clay occurs in veins and pockets in the quartzite rock, and since in some zones it actually replaces the particles of rock, it is obvious that it could have been brought into its present position from without. The quartzite has been much folded, faulted and shattered, thus providing the interstices in which the clay has lodged. There is thus far no evidence to show conclusively whether the clay was concentrated in its present position from rock that at one time covered the present surface, whether it was leached by surface agencies, or whether it was forced up from below by means of ascending hot solutions. The



proximity of the large masses of intrusive granite tends to support the latter theory; and if so, the chances for the extension of the clay deposits to great depths are favourable. A deposit due to the action of superficial agencies would be limited in depth.

Character of the Deposits

As indicated above, the China clay is associated with much shattered vertical beds of quartzite rock. In places there are veinlets and veins of pure white clay, up to a foot or more in width; but the bulk of the clay occurs in admixture wtih particles of quartz, or filling little cavities in the quartzite. As commercial sources of clay, the veins are too small to work alone, and the quartzite rock, which contains on an average 11 per cent. of clay, is too lean, though there is a tremendous quantity of it available. Hence the commercial possibilities at present are confined to areas within the 1,000 foot zone of quartzite rock where the proportion of clay is higher than the average.

By no means all the clay present in this zone can be classed as China clay. The larger part of what has been exposed up to the present is stained with iron and must be classed as fire clay. Fortunately this fire clay has proved to be an excellent material for saggars,—a requirement rather hard to fill. When washed, it provides a buff coloured clay, suitable for certain purposes.

The accompanying plan shows the lenses of China clay and of fire clay disclosed in the small part of the zone examined up to the present. The two lenses of China clay, only one of which has as yet been delineated with any precision, are enclosed within fire clay, all of which carries about 40 per cent. clay, the remainder being quartz. This zone of clay, from 100 to 200 feet in width, is enclosed within pure, white quartzite carrying about 11 per cent. of clay, as mentioned.

Size of the Deposits

Formerly the clay was won entirely from open cuts and pits. Now, mining methods have been resorted to, and have proved completely satisfactory. One lense of China clay has been developed so far by this means, as shown on the plan. The shaft is 100 feet deep, and the drifts have disclosed a lense 200 feet by 60 feet. The lense to the south has been developed only by an open cut, and consequently is not so well defined. In the one lense there is now developed, between the surface and the first level, 25,000 tons of China clay, exclusive of the quartz with which it is mixed. The production from this lense to date has been 7,000 tons.

Of fire clay, 300,000 tons has been developed. A large quantity is still available by open cut methods. 10,000 tons of fire clay has been shipped to date.

For making saggars, the natural mixture of clay and quartz is used. Of this material there is available, above the 100 foot level, over a million tons.

What more extensive exploration will disclose it is impossible to predict. But the proved value of the small portion of the zone already examined suggests that here may lie sufficient clay of various qualities to provide not only for the needs of Eastern Canada, but for a substantial export trade.

Plant

The process of preparing the crude China clay for market is simple, as is the plant required. After being loosened with dynamite, the crude clay is trammed to the shaft and hoisted to the surface. Subsequent operations are illustrated in the accompanying flow-sheet.

The whole process of ore-dressing in this case consists in separating the clay from the grains of quartz and from stray chips. The ore is so friable that a log washer is sufficient to disintegrate it thoroughly. A large part of the quartz, as coarse sand, is shovelled out from the washer. The flow of water carries fine sand with the clay through two long series of troughs, each series being about 500 feet in length, where even the finest sand has a

Filter Presses and Filter Cakes

chance to settle out. The clay bearing water is now run through a revolving screen to remove chips, and then into large settling tanks, which are filled in succession. Here the liquid is allowed to stand for 24 hours or more, by which time the supernatant liquid is clear and is decanted to return to the circuit.

The thickened pulp in the bottom of the settling tank, called "clay slip", is now pumped at 100 pounds pressure through filter presses, the filtered water being returned to the circuit. The filter cakes, containing about 25 per cent. moisture, are placed on racks and wheeled in car loads into a drying tunnel, through which is blown a stream of air heated by steam coils. When thoroughly dry, the filter cake is broken to lumps and elevated to a large storage bin, ready for market.

The present capacity of the plant is 10 tons of washed clay per day of 18 hours.

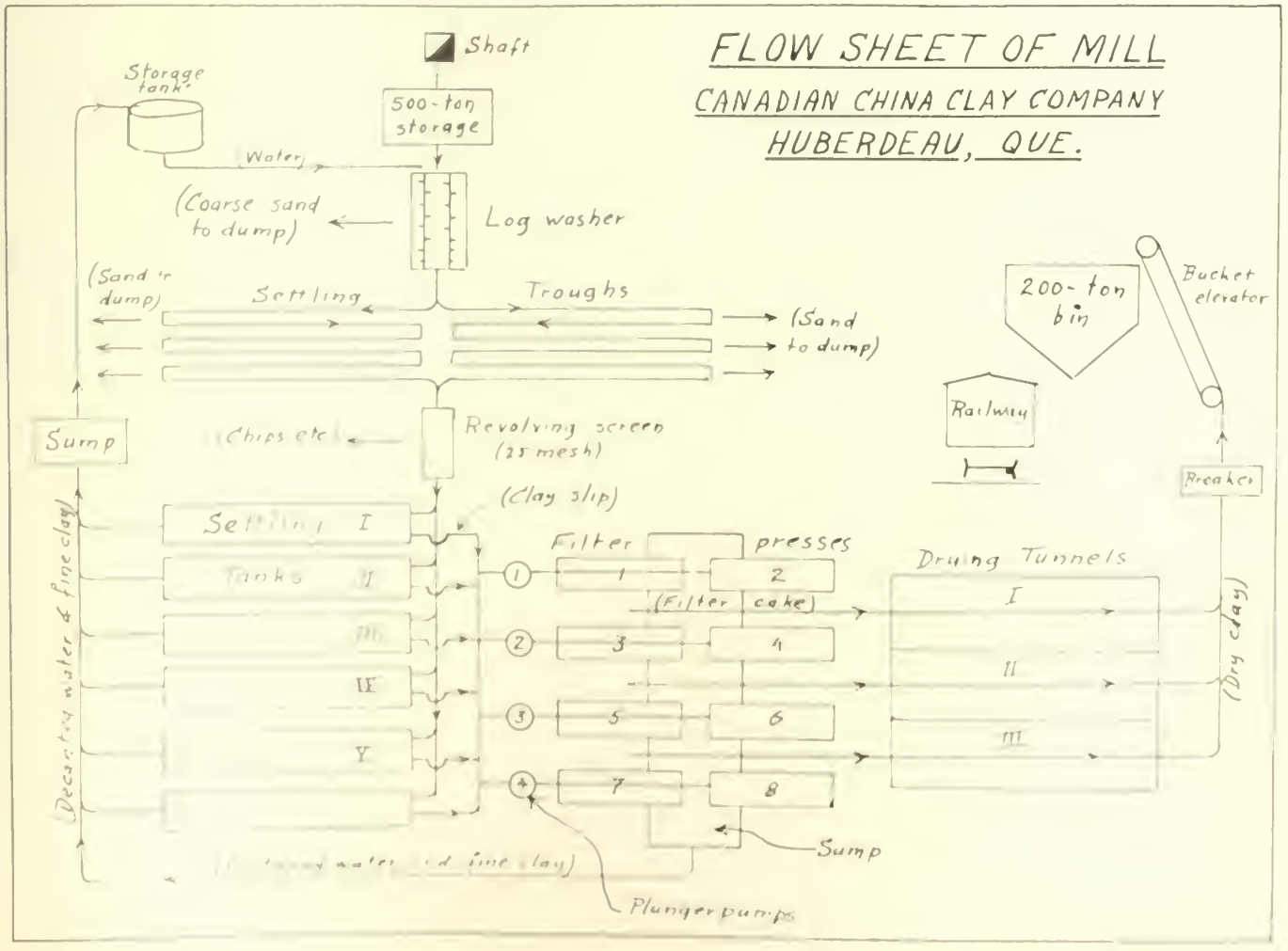
Preparation is being made to alter this flow-sheet with a view of economising labour and power and increasing the output. A sand pump will be installed at the bottom of the shaft to elevate the crude ore, with the mine water, to the surface. This will eliminate the need for the log washer. The pulp thus elevated will be passed through cone classifiers, which will eliminate not only the coarse sand now taken from the log washer, but a large part of the finer sand now caught in the settling troughs.

Quality of the China Clay

A typical analysis of the China clay is as follows:

Silica	47.50 p.c.
Iron Oxide	1.06
Alumina	36.98
Lime	0.23
Magnesia	(trace)
Loss on ignition	14.10
Potash	0.19
Soda	0.18
	100.24 p.c.

It is of a pure white colour, and its content of iron is less than that of the best Cornish clay imported into Canada. Its content of grit is unusually low, being about 0.08 per cent in the form of fine particles of quartz not over 0.05 mm. in size.



This clay is competing favourably now with some of the best imported Cornish clay, the standard in the United States as in Britain. For certain purposes the Huberdeau clay is superior to that brought from England, and it is on this account that its present ready market is available.

Fire Clay

From the parts of the deposit stained with iron oxide a buff or cream-coloured washed clay can be produced,

Filter Cake at Exit of Drying Tunnel

which has a limited use in commerce. At present none of this is separated, the natural mixture of clay and quartz being sold as saggar clay.

Saggar Clay

A notable feature of the deposits at present is the very large amount of fire clay available for making saggars and its excellent quality for this purpose. A Canadian plant has been using this material, in its natural state as shipped from the mine, for some time, and finds that its saggars last much longer than those from imported material. If, by judicious admixture with other clays, such favourable results can be generally obtained in ceramic plants using saggars, a very wide market will be opened for Huberdeau saggar clay.

Quartzite

The quanty of pure quartzite available in the Huberdeau deposits is very large. From the crude rock the China clay can be readily removed by washing and recovered. While it does not pay to treat the rock for the 11 per cent. of clay that is in it, if there were a market for the resulting pure silica as well, it might pay handsomely. In such a case, it would pay best to ship the crude rock from Huberdeau and treat it at the glass works or other point at which the silica was to be used. At present there is no such market in sight.

* * *

The writer wishes to acknowledge the courtesy to him of those in charge of the operations of the Canadian China Clay Company. The manager is Mr. Alexander H. Smith, whose experience while tunnelling in "The Bluff", Belginm, now stands him in good stead when mining the peculiar clayey ore at Huberdeau. The local superintendent is Mr. S. N. Tremblay, who is quite widely known in the bush-whacking fraternity, and has now succombed to the inducements of life as a miner. These two Canadian engineers bid fair to retrieve the fallen fortunes of the Canadian China Clay Company, and to provide in the midst of the Laurentian Highlands at Huberdeau an additional unit for the ever-expanding mining industry of Canada.

MABERLEY DISTRICT

During recent years the Maberley district, west of Perth, Ontario, has produced a considerable amount of feldspar. A great many small pegmatite dykes have been explored, a number have furnished small amounts of merchantable 'spar, and a few give promise of consistent production. The most consistent producer up to the present is the quarry of Orser and Kraft, $1\frac{1}{2}$ miles north of the Lake Shore line of the Canadian Pacific Railway, in lot 13, concession V, South Sherbrooke township.

As in the Verona district, the pegmatite dykes of the Maberley district cut granite gneiss, and contain in places many accessory minerals in addition to the feldspar and quartz of which they are essentially composed. It is in the Orser and Kraft quarry that the radium-bearing mineral euxenite was discovered in 1916. The euxenite does not occur in sufficient quantity in this dyke, where at present exposed, to warrant any attempt to recover it; but occurrences of commercial importance may yet be found in this or other dykes.

EDITORIAL NOTES (ADDITIONAL)

There has just been issued in *Summary Report*, 1921, *Part D* of the Dominion Geological Survey, Dr. F. J. Alcock's report on the zinc lead deposits of Gaspé, Quebec, which is reviewed briefly on another page. The development of these deposits has already disclosed sufficient ore to warrant the conclusion that here lies one of the important zinc-lead deposits of the continent. During the present season the Federal Zinc and Lead Company is concentrating its funds and its energies upon building a good road to connect the mine with the railway at Cascapedia, a distance of 45 miles. In this they have not received one dollar of assistance from the provincial government of Quebec, though the development of this mine and the building of the road will undoubtedly open up for prospecting, and for settlement in restricted areas, the interior of the long-neglected Gaspé peninsula. This is a strange situation and reflects little credit on the government at Quebec. Messrs. Lyall and Beidelman are to be congratulated on the energy and confidence they display in progressing, unaided, in this big undertaking.

Our Nova Scotia correspondent reports that negotiations between miners and operators have reached an impasse, and he suggests that the solution of the difficulty in Britain last year might logically be adopted here. He insists, and rightly, that the present disturbance is due principally to the recent interference by the Federal government in what was essentially a domestic disagreement. If the miners and operators had been left to compose their differences without outside interference, it is probable that there would be now no threat of a strike. Hence it is quite logical that the meddlesome Federal authorities should now bear the onus of a settlement. Unfortunately, these authorities seem to have faculty for sidestepping in such a case, plading those same rights for local autonomy that they have previously denied.

Storrington Feldspar Quarry

On lots 7 and 8 of the 13th concession of Storrington township in the county of Frontenac there are large dykes of white feldspar that have excited interest periodically for the last fifteen years. Until 1912-13 the locality was inaccessible by railway. In that year the Toronto-Ottawa line of the Canadian Northern railway was completed, running within less than a mile of the deposits. During the war nothing was done; but in 1920 some stripping and preliminary sampling led up to the shipment of a trial carload of 'spar from one of the dykes. This carload proved thoroughly satisfactory, so the property was opened up for consistent production in 1921.

Geological Occurrence

The feldspar occurs as dykes in crystalline limestone of the Grenville series. The origin of these dykes has not been definitely determined, but it can be assumed meantime that they are [illegible] the widespread intrusions of granite that is found [illegible] throughout the countryside. Dykes of feldspar in limestone are of common occurrence, but it is unusual to find them containing so little impurity [illegible] as those here described.

Quarry Face Storrington Feldspar Company

Description of Dykes

The main [illegible] deposit of feldspar on which the present quarry is [illegible] comprises a ridge rising to a height of 7 [illegible] above the shore of Upper Rock Lake, and extending inland in a northwest direction for a distance of 800 feet. The width varies from 25 feet at the water's edge to [illegible] 100 feet at the quarry face.

Parallel to this dyke [illegible] is another similar one to the north, and three [illegible] to the south. These have not been stripped or [illegible] to the extent to which at present opened up will provide feldspar of the quality required for the ceramic industry for [illegible] to come.

Quality of the Feldspar

The dyke is composed almost wholly of white feldspar. In places there is a graphic intergrowth of quartz, but its quantity per cent. is not sufficient to affect appreciably the quality of the 'spar. A more serious accessory mineral is a greenish grey silicate of alumina, lime and magnesia, which occurs here and there in little bunches and must be removed by cobbing.

A representative partial analysis of the feldspar is as follows:

Potash (K_2O)	11 p.c.
Silica (SiO_2)	67 p.c.
Lime (CaO)	21/2 p.c.
Iron	(trace)

Transportation Facilities

The quarry is seven-eighths of a mile from the Canadian National Railway. As the land route is hilly, it has been found expedient to use a water route. An inclined trestle 900 feet long carries cars of feldspar on two-ton trays from the quarry to the shore of Upper Rock Lake, where they are wheeled aboard a scow of six tons net capacity. This scow is towed to the railway across two small lakes and through a channel connecting them. A siding has been constructed at the water's edge, which allows the trays, raised by a derrick, to be dumped direct into the railway cars. Thus there is only one handling of the material, that at the quarry face, and trans-shipment is effected in the simplest possible manner.

During the winter the trays of feldspar are handled from the quarry direct to the railway over the frozen lakes and loaded direct into the railway cars by means of the derrick.

The channel between the two lakes presented a serious difficulty for some weeks. It was filled with the loose, slimey material common in small lakes and bogs, bound together with roots, stumps and logs. It was finally cleared by blasting loose these obstructions and then removing the loose material to deep water by means of a drag line scraper, operating under water from a scow anchored in the lake. The spring freshet has effectually widened and deepened the artificial channel thus made.

The railway siding put in for the Storrington Feldspar Company is 3¼ miles from Kingston.

The capacity of the present plant is twenty carloads (about 800 tons) of feldspar a week. As the deposit is very large and of uniform quality, and since this quality in spite of the content of lime, is suitable for quite a wide range of ceramic products, it is reasonable to expect that the Storrington Feldspar Company will develop into a large shipper of Canadian feldspar.

THE CAMPBELL FELDSPAR DEPOSIT

Since going to press, we have received from Mr. A. M. Campbell of Perth, Ontario, a description of a large dyke of feldspar that he is engaged in opening up, which can now be noted only briefly. It is on lot 20, concession IX of Bathurst township, 5 miles northwest of Glen Tay station on the Canadian Pacific Railway, with which it is connected directly by road. The dyke is 300 feet wide and has been traced for a distance of 1000 feet. The feldspar is high in potash and is said to be sufficiently free from deleterious impurities to allow of commercial use. Mr. Campbell invites an inspection of his deposit, which has been well exposed by stripping and blasting.

A Successful Flotation Mill

BY L.H. BIGGAR.

A notable address was delivered by L. H. Biggar before the recent International Mining Convention at Nelson B. C., in which he showed that the new mill, installed at the Ottawa Mine, situated on Springer Creek at an altitude of 5,333 feet and five miles from Slocan City, had already saved $25,000 from the waste dumps of the property. Mr. Biggar's description of the flotation system adopted follows:

Owing to the fact that previous to our starting milling operations there had been no attempts made in this district to concentrate this type of ore, and in view of there being several properties in the neighborhood with ore of a similar nature, this paper is submitted in the hope that some of the data contained, and an account of our milling operations, may be of interest and possibly of use to those interested in properties containing ore of a similar nature.

Description of Ore

The ore is essentially what is known as dry silver ore, this term meaning as I understand it, that it is comparatively, if not entirely, lacking in a lead or zinc content, not, as some might infer, lacking in a liquid content.

The silver occurs in the form of argentite, or silver sulphide, native silver, and grey copper, in order of their proportion, and the gangue is chiefly a hard, white quartz. An average analysis of the mill feed to date is: Silver, 9.8 ounces per ton; lead and zinc, nil; iron, 2 per cent.; lime, 2 per cent.; magnesia, 2 per cent.; barium sulphate, 2 per cent.; alumina, 2 per cent, and silica, 86 per cent.

All ore milled to date has been drawn from the old waste dumps of the property, and it was with a view to treating these and the stope fillings in the mine that the concentrator was built. The above analysis is an average of the values contained in 6,000 tons from the dumps which we have milled, and on which I have based my figures in this report.

Under the conditions existing two years ago, when the construction of the concentrator was considered, and, for that matter, under any normal conditions, it was obviously impossible to ship this grade of ore, or so-called waste, to the smelter at a profit, especially as the dumps are situated over five miles from the nearest railway and the smelter is some 80 miles distant from our shipping point.

It was in the hope of being able to concentrate the silver values mentioned which were spread throughout the large tonnage of the dumps, into a sufficiently small tonnage to be shipped at a profit, with a high recovery of the silver and at a reasonable cost, that the concentrator was built.

Cost of Mill and Tramway

For the sake of those contemplating the construction of a mill to treat ore of a similar nature and as a matter of record, it may be of interest to know the actual cost of construction of the mill, aerial tramway, etc. The capacity of the mill is 50 tons per 24 hours, and it is supplied with feed by a two-bucket jig tramway, 200 feet in length, with a capacity of 80 tons per eight hours. This tramway connects the dumps with the mill, there being, necessarily, chutes and surface tramways installed at the dumps to render all the dump material tributary to the upper terminal of the aerial tramway.

The mill complete, and on an operating basis, handling its rated tonnage, cost approximately $30,000. This does not, however, include the cost of a power installation, as we were fortunate enough to have to install only a motor-Pelton wheel and 200 feet of pipe line, as there was a flume and pipe line already in place which we utilized. With our installation and a water supply of six cubic feet per second, we have available 140 horsepower. Our horsepower consumption, running at full capacity, is approximately 110.

The aerial tramway, including the cost of clearing the right-of-way and the construction of the upper and lower terminals, cost approximately $8,000. Several local features, such as the scarcity of suitable timber for towers, and the precipitous nature of the side-hill on which the tramway is built, tended to make this, I consider, a little above the average cost. The surface tramways, chutes and equipment for handling the dumps and stope fillings, which are spread over a fairly large area, cost approximately $1,000.

The total cost of the installations, which we may say were from the "grass roots up," were roughly $39,000.

The Mill

A description of the flow sheet of the mill is as follows: The ore is delivered at the mill by the aerial tramway to a 45-ton storage bin. It is fed from here over an inch grizzly to a 7 inch by 10 inch Blake crusher, the undersize from the grizzly and the chrushed discharge passing into a 40-ton feed bin. The crusher is kept well set up, the maximum size of the ore on discharge being from one inch to one and a half inches. The ore is fed from here by an automatic feeder, direct to a five-foot by 22-foot tube mill, carrying a ball load of three-inch steel balls weighing approximately five tons. This mill serves both as a primary and secondary grinder, and has proved very satisfactory in that capacity. The tube mill discharge, a description of which follows later, is elevated by a 20 foot bucket elevator, and supplied direct to a nine-cell Minerals Separation machine. The lack of classification of the tube mill discharge may be considered as a weak spot in the flow sheet—and rightly so—but it was rendered necessary by the trouble experienced in getting this unusually coarse feed into the mill. To overcome this problem it was necessary to install a feeder consisting of a 4½-inch pipe "T", with a converging launder from the feeder and with a quarter-inch high-pressure nozzle inserted in a wooden plug at one end of the "T". The jet produced here is sufficient to carry the feed, coarse or fine, to a spiral conveyor that runs for a distance of three feet through the mill trunion and head into the body of the mill.

This jet, however, has a tendency to reduce the density of the pulp to a considerable extent, and the additional fluid necessary to convey the oversize from any method of classification of the discharge back to the feed end was found to exaggerate this to a point where it became impossible to control.

It has been found possible, however, without classification, to maintain the density of the pulp at from 60 to 65 per cent solids, and to obtain a discharge of 90 per cent through 80 mesh, which has allowed the flotation machine to maintain an excellent recovery.

The first six cells of the flotation machine deliver concentrate, which is laundered to a series of settling tanks, and dewatered. The last three cells deliver middling which is returned to the bucket elevator, and kept in closed circuit with the machine. The tailing from this machine goes direct to the creek.

The concentrate has been easily settled and dewatered, the average moisture content during the summer months being 15 per cent. The small daily tonnage of concentrate produced did not, in my mind, warrant the installation of a filter. There are three settling tanks in series and so far as can be ascertained there is but very little loss in the overflow from the last of these. The concentrate is shoveled from these tanks to a drying platform, sacked, and shipped.

Concentration by Gravity Impossible

One important feature of the treatment is, that on account of the silver values in the ore being so finely disseminated throughout the gangue rock, it was impossible to treat this ore by any method of gravity concentration, and not even a small satisfactory percentage of recovery could be obtained by this method. It was necessary, as the flow sheet shows, to grind all the mill feed to a suitable mesh for flotation treatment, and the entire recovery of the silver is obtained by this means.

The feed of the flotation machine is ground to as nearly as possible 100 per cent through 80 mesh, it having been demonstrated that at this size the silver particles are satisfactorily liberated from the gangue. The feed to the machine is maintained at from 2.5 to 3 parts of water to one of solids.

Recovery of Silver Values

The average recovery of the silver, from the 6,000 tons considered here, has been 76 per cent and of the iron only 10 per cent. The ratio of concentration has averaged 52 tons to one. In other words, of the 6,000 tons we have milled, averaging 9.8 ounces in silver per ton, we have shipped only 115.5 tons of concentrate, these few tons, however, containing on an average 390 ounces in silver per ton, and containing 76 per cent of the silver originally distributed in the 6,000 tons of dump material, the gross value of this production being over $30,000.

Another interesting feature to my mind is that the barium sulphate and alumina present in the feed have shown a tendency to concentrate to a certain extent. This may be of interest to some, as neither of these minerals are considered to be suitable for concentration by this method. It is generally considered essential that the minerals or metals be in the native form or sulphides to be easily and profitably treated by flotation. A vast amount of experimental work has been carried out, of late, along these lines, and possibly progress has already proven these other minerals amenable.

Cost of Concentration

A short summary of our operating costs, and their distribution, may also be of interest. Based on last month's operations, with a record of 1775 tons milled, our costs were as follows:

Mucking and surface Trimming, per ton of feed, 55 cents, aerial tramway 10 cents, a total cost of 65 cents per ton of ore delivered at the mill.

Milling, divided as follows: Labor per ton, 63 cents; general charges 19 cents; flotation oil, two pounds, 12 cents; steel balls, 2.2 pounds, 15 cents; depreciation and insurance, 25 cents, making a total cost of milling, which includes hauling to the railway and loading, of $1.25.

A charge of 30 cents per ton of feed covers the cost of freight to the smelter, and treatment.

The total combined cost of reclamation, tramming, milling, freight and treatment was thus $2.20 per ton of feed.

Largely on account of the simplicity of the flow sheet, we have been able to maintain the percentage of possible time run at an average of 94.7 per cent for the last six months.

In conclusion, I must apologize to some, at least, for the profusion of figures in this paper, which may make it sound like an income tax report, but in a case of this kind I think that figures speak better than words.

I wish to express apreciation for the advice and assistance I have received from numerous operators, the Consolidated Mining & Smelting Company's staff, and many others, in the technical work, and to mention my good fortune in having been able to secure from the beginning certain partners in the enterprise, and men to carry out the construction work and operating, who have shown loyal co-operation and offered much useful practical advice.

The results obtained, if they are useful to the district and the province, as I hope they may be, are largely due to the powers of assimilation and the co-ordination of the technical and practical activity of many, who have been keen to see the process prove a success.

OXYGEN PRODUCERS CONSOLIDATE

The consolidation recently of the manufacturing and distributing resources of the Dominion Oxygen Company, Limited, and the National Electro Products, Limited, gives to Canada one of the largest organizations of its kind on the continent. The business is henceforth to be conducted under the name of the Dominion Oxygen Company, Limited, now operating oxygen plants at Montreal and Toronto, and acetylene plants at Merritton, Winnipeg and Shawinigan Falls. In addition the company conducts oxygen and acetylene distributing stations at Hamilton, Windsor and Quebec.

It is claimed that the union of the two companies will be of material advantage to all Canadian oxygen users through stabilization of the product, assurance of steady supply and certain improvements in service facilities that will be made possible.

It is understood that Mr. W. J. Cluff and associates, of Toronto and Montreal, who founded the National Electro Products, Limited, several years ago, will retain their relationship with the oxygen industry through their interest in the consolidated companies.

USE OF DIAMOND DRILL IN OIL PROSPECTING

Prospecting for oil with diamond drills is being carried on extensively in Washington and Montana, according to F. A. Edson, petroleum engineer of the United States Bureau of Mines, who recently visited various centers of activity in the Northwest and Middle West. It is generally found to be less expensive to prospect with a diamond drill than by other methods. Mr. Edson has acquired much information regarding the practice of diamond drilling in oil prospecting, which will be used in the preparation of a report on the subject to be issued at a later date.

The Malagash Salt Deposits

By JOHN MOFFATT

The recent opening up of the Malagash salt bed has interested mining men all over Canada and has focused attention on Nova Scotia as a Province rich in minerals. It has also set the native Nova Scotian thinking and some are beginning to perceive that lack of early enterprise may have long delayed the beginning of an industry that bids fair to become of international importance. The work of mining salt at Malagash is in the initial stage, but has been sufficiently developed to demonstrate that great beds of salt await the pick of the miner to loosen it and send it on its way to markets that lie conveniently all around. The position of the mine is such that these markets can be easily and cheaply reached.

Early Manufacture of Salt in Nova Scotia

The finding of salt springs early attracted attention, and in different parts of Nova Scotia salt was made in quantity from the briny waters of some of the larger of these springs.

As early as 1836, large quantities of salt were made by evaporation from the salt springs at River Philip, Cumberland County. About the year 1860 the Brine Springs, Antigonish County, yielded considerable salt through the same process. Six years later operations were carried on by an incorporated company on what is now the site of Antigonish Town. Much work was done and a number of boreholes were put down, but although a fair flow of strong brine was pumped from one of these holes, after a time the strengh of the brine became very much reduced and the work was abandoned. Salt springs are found in many parts of Antigonish County.

Initiating the Present Undertaking

It remained for Mr. A. R. Chambers and Mr. G. W. McKay, two enterprising young men of New Glasgow, to make the mining of salt in Nova Scotia an industry with a steady output from a real mine. This mine is producing 40 tons of salt a day. Five years ago the attention of these men was drawn to the salt-bearing measures at Malagash, Cumberland County. After assuring themselves that salt in sufficient quantity was to be found in this district, a number of holes were put down by a diamond drill to make further tests of the salt strata, and to enable them to locate a place for a shaft. These holes ranged in depth from 85 to 113 feet. Results were so satisfactory that a shaft was sunk. The seams vary in size, in color, and in quality. There is grey, white, and red salt, dirty salt, gypsum and shale with salt; and although some of it is not white it has a high commercial value and only requires a change in choice of color to popularize it. Public taste, however, must be satisfied, and in this mine there are several seams of pure white salt, ranging all the way from four to twelve feet in thickness. The salt, when crushed and assorted, has been found fit for almost all the uses to which salt is put and a good trade is being worked up.

Outline of Operations to date

A shaft has been sunk 160 feet vertically, the lower 75 feet being in salt strata. About 600 feet of levels and cross-cuts have been driven in the salt. From July 1919 to date about 9,000 tons of salt have been mined. The full capacity of the present plant is 60 tons a day. The products at present marketed are lump, coarse, medium and fine domestic grades, and land salt (fertilising salt). The present price range from $7.50 per net ton at points of consumption for fishery salt, up to $30.00 per net ton for small lots of special grades. Present indications are that land salt will have a much larger market than the fishery and dairy grades, and the owners are at present putting into operation an effective scheme of sales which has been worked out with the grocery jobbers, to whom this scheme has appealed very strongly. It has the added advantage that it eliminates the jobbers as competitors in the selling of other salts to all trades except the fishery. The cost of production with present equipment is $5.00 per net ton on board vessel, but the owners, having been for years managing the Wabana Iron Mine (probably the largest single iron mine in the United States or Canada), know from Wabana experience that with the proper equipment a cost of $2.50 per ton could be obtained.

Up to date, energy has been devoted mainly to developing the property and proving the suitability of the product for various markets, ascertaining competition, and no attempt has yet been made to produce on an economic scale. The property is exceedingly well situated for distribution by schooner and cheap water rates can now be obtained.

Description of the Deposits

Chambers and MacKay hold 20 year leases from the Nova Scotia Government on 10 square miles of land covering practically all the Malagash Peninsula, an area 5 miles long by 2 miles wide as indicated on the map. The Government receives a royalty of 20 cents a ton for the salt as mined and will compensate the owners of the land by giving them 25 per cent. of the royalty received or 5 cents per ton.

The Malagash deposit is similar to the German deposit at Stassfurt in many respects. A potash zone has been penetrated at two points thirty feet apart, varying in thickness from a few inches to 5 feet. In one place a full shot from the face ran 8.73 per cent. potash. Chambers and MacKay have the opinion of some prominent chemists that the economic production of fertilising potash from the vein already opened up is quite possible and the prospects of richer deposits in depth very favorable.

The following table shows the analysis of Malagash salt as compared with other salts commonly used:—

	Malagash	Liverpool	Turks Is.	Mediterranean	New York
Insoluble	.50	.086	.18	.27	1.0
Iron & Alumina	Faint traces	Traces	Traces	Traces	Traces
Lime	.37	.515	.72	.35	.24
Magnesia	.01	Traces	.48	.47	.05
Sulphuric Anhydride	.46	.252	1.20	.94	.27
Sodium Chloride	98.66	98.961	97.42	97.97	98.44

A study of this table will show that Malagash salt is low in lime and magnesia, both of which impurities are detrimental in curing fish and meats, imparting a bitter taste to the food products. The sodium chloride content compares favorably with the best.

The insoluble matter in Malagash is the mineral Anhydrite or calcium sulphate. This impurity is harmless and does not affect fish or meats in any way.

The following quotation from Geological Survey Memoir No. 121 indicates the market available: "The import of salt into Canada in 1918 mounted to 165,494 tons, valued at $1,267,169. Of this amount 100,103

Lead Smelting Practice at Trail

BY J. BUCHANAN

The following paper was read by J. Buchanan, smelter superintendent at the plant of the Consolidated Mining and Smelting Co. of Canada, before the International Convention recently held at Nelson, B. C.

There have been many changes in the practice of smelting lead ores at the Trail plant since the first furnace was blown in, in 1899. Some of these have been forced on the smelter on account of the changing characteristics of the ore supply, while others have been made in efforts to improve the efficiency of the plant. An extreme example of the first kind was when the scarcity of ores high in sulphur content made it necessary to smelt a charge containing only 15 per cent. sinter, the balance consisting mainly of zinc plant residue — residue from leached zinc concentrate — with a small amount of oxidized ore and lime rock. As the zinc plant residue was all finer than 100 mesh, and the oxidized ore almost as fine, it was not a charge that one would care to smelt except under very exceptional conditions.

The outstanding examples of the second class of changes are:

(1) Double sintering by Dwight and Lloyd machines of a large percentage of the blast furnace charge and the consequent elimination of pre-roasting in Wedge roasters.

(2) The use of granulated lead blast furnace slag, which will mentioned later.

The Evolution of Double Sintering

This double sintering has been evolved by degrees, starting from the time when the Dwight and Lloyd representatives undertook to make a first-class sinter from Sullivan ore, which assays about 28 per cent. sulphur, with a small amount of flux.

The first step was a partial double sintering, whereby the fines made by the Huntingdon-Heberlein pots were screened out and formed part of the Dwight and Lloyd charge. This was the nucleus of what afterward became the practice, as will be seen.

At this period all ores with more than 10 per cent. sulphur were roasted in Wedge multiple-hearth roasting furnaces, and then sintered with addition of flux and sintering ores in Huntingdon-Heberlein pots or Dwight and Lloyd machines.

Ores containing [illegible] to 10 per cent. sulphur were known as [illegible] and were sintered but not roasted. Ores with less than 8 [illegible] sulphur were classed as direct smelting ores and went direct to the blast furnace charge bins.

Flue dust and [illegible] that were briquetted, and formed part of the blast furnace charge.

The charge to the sintering machines and Huntingdon-Heberlein pots during this time would average somewhat as follows: Calcine [illegible] per cent.; sintering ore, 16.4 per cent; lime rock, 14.1 per cent; producing a sinter of the following analysis:

Lead	28.9%
Zinc	9.5
Sulphur	4 to 6
Silica	8.2
Alumina	1.6
Iron	17.8
Manganese	3.
Calcium oxide	8.6
Magnesium oxide	2.1

The charge to the blast furnace was approximately, sinter, 46 per cent; lime rock, 4 per cent; by-products, 24 per cent; briquettes, 8 per cent; direct smelting ore, 18 per cent. This produces a slag of the following composition:

Silver	0.97%
Copper	0.15
Lead	1.80
Zinc	10.30
Sulphur	4.30
Silica	22.60
Iron	22.60
Manganese	5.
Magnesium oxide	2.
Calcium oxide	11.80

During this period there was considerable blast furnace trouble, due to high zinc and high sulphur on the charge. The volatilization losses were heavy and it was apparent some radical change would have to be made in order to improve the metallurgy of the plant.

At this time the lead ore from the Sullivan mine, our largest shipper, was crushed to about one-quarter inch for treatment in the Wedge roasters, screen analysis showing about 30 per cent. on 6-mesh. Owing to the compact nature of the ore only a very thin layer on the outside of the larger particles was roasted during their passage through the Wedge roaster.

On the other hand, experiments made with various mixtures on the Dwight and Lloyd machines showed that under proper conditions a sinter, good physically, and low in sulphur content, could be made in two passes over the machine. No. D. & L. machines being available at this time for double sintering, the product of the D. & L.'s was dumped in a pile, wet down thoroughly, and returned to the H. & H. pots, where the second sintering was done so that during this period the major portion of the sintering charge was actually roasted three times.

Since 1919, conditions have been such that the Wedge roasting plant has been shut down, and all the sintered material has been twice through some combination of the D. & L.'s and H. & H. pots. In reality a considerable proportion of the final sinter is still roasted three times, as the zinc plant residue, which forms 30 per cent. of the initial sintering charge, has already been roasted prior to the leaching out of the zinc. Further experimental runs on a second sintering on the D. & L.'s were made from time to time whenever a machine was available, and it was found we could make a sinter lower in sulphur than the pot product, and although it did not stand up as well as the latter, seemed to smelt faster in the blast furnace.

This led to a request for more Dwight and Lloyds, as our plant at that time consisted of only three of these machines, and they were kept busy on pre-roast. It was finally decided to double the D. & L. sintering capacity

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tons were [illegible] per cent. [illegible] Gulf of [illegible] developed [illegible] and a good [illegible] dustry, a [illegible] should be [illegible]

Chamber [illegible] and data [illegible] markets, [illegible] erty

and three more machines were added, and these were completed and put in operation in October, 1920. These new machines were put on pre roast, and the older ones on second sinter

The Sintering of Fine Materials

Up to this time we had always had a sufficient supply of coarse ore — ore crushed to one quarter inch — on the pre roast charge, and we had no difficulty in producing a satisfactory product for the second sintering machines; but with the second sintering, the gradually diminishing receipts of custom ore, and the successful concentration of the lead in the Sullivan mine (one of the Company's mines) by flotation, we were faced with the problem, new to us, of having to handle practically nothing but flotation concentrate and zinc plant residue. The zinc plant residue as delivered to the smelter contained anywhere from 18 to 22 per cent. water, and the flotation concentrate 10 per cent. water. As those two ingredients formed 75 per cent of the pre roast charge, some difficulty was at first experienced in producing a satisfactory first sinter; the charge, though "balling up" nicely in the mixer, packed tightly on the machines and made ignition and the passage of air a difficult matter. The addition of flue and Cottrell treater dust to the charge corrected this, the dust coating the outside of the granules or cohered particles of charge, and absorbing moisture very slowly, kept the charge open, and prevented the formation of an impervious mixture when delivered to the machine.

The charge to the pre-roast Dwight-Lloyds, 75 per cent. of which would pass a 200-mesh screen, was now as follows: Flotation concentrate, 44 per cent.; zinc plant residue, 32.4 per cent.; lime rock, 11.5 per cent.; silicious ore, 6.3 per cent.; flue dust, 5.8 per cent., producing a sinter of the following analysis:

Lead	36.8%
Zinc	13.3
Sulphur	10.7
Silica	3.8
Alumina	1.3
Iron	16.2
Manganese	3.
Calcium oxide	3.6
Magnesium oxide	1.5

This product on being crushed to one-half inch was re-sintered, and this second sinter, while fairly low in sulphur (usually under 3 per cent) was very friable, and broke up badly before it reached the blast furnaces. Several attempts were made to improve this condition by varying the constituents of the charge, but without much success.

Improving Friable Sinter

Finally, experiments with varying percentages of granulated lead blast-furnace slag were tried, and it was at once seen that the addition of the slag had a very beneficial effect on the physical condition of the sinter produced. With the addition of 15 per cent. of slag to the crushed pre-roast, a well fused, hard, porous sinter was produced, which stood handling well and was delivered to the blast furnaces in first-class condition. The effect of this sinter on the blast-furnaces provided a pleasant surprise, the net tonnage smelted (eliminating the slag) increasing approximately 35 per cent.

This is clearly shown by comparing the six-month period preceding the use of granulated slag in the sinter, and the first six months following the change, as follows:

Tons smelted, without slag, 51,125; furnace days, 368; average per day, 139.

Tons smelted with slag, 67,615; furnace days, 362; average per day, 188.

While the addition of slag to the sinter increased the zinc in the blast furnace charge, no bad results were experienced, as the sulphur on charge was generally under 1.5 per cent.

Blast furnace slags as high as 21 per cent. zinc have been run without the slightest trouble, an example being:

Silver	0.2%
Lead	2.4
Zinc	21.1
Silica	15.8
Iron	33.1
Calcium oxide	6.

Hood and Hanging Charges

We always experienced considerable trouble from hot tops and furnace crusts, and have tried out the various types of spreaders that have been reported as successful at other plants, sometimes even running with no spreader at all.

In an endeavor to get the advantages of the thimble type of hood, without the disadvantage of having the top of the furnace closed and inaccessible for convenient barring, the furnace was arranged for side-dump, still retaining the old smoke hoods.

An experience we had recently with a furnace that hung up, and that had to be blasted before the charge would settle, convinced us that under our conditions the open type of hood has many points in its favour. In this particular case a bridge formed across the furnace, running its full length, about six feet above the tuyers. All the usual methods failed, a two-inch pipe eight feet long and pointed at one end was driven down six feet into the charge. A stick of powder, with fuse attached, was tied to a piece of string, and suspended directly over the pipe opening, the end of the string being passed outside the hood and held there. The fuse was lit, and the man holding the string dropped the charge of powder down the pipe. A hole 18 inches in diameter was made down through the bridged charge, and the furnace being empty for six feet above the tuyeres, no difficulty was experienced in barring down the rest of the charge.

Since using the side feed we have had less trouble with crusts on the furnace sides, although crusts still form at the ends owing to a segregation there of the coarser constituents of the charge. This can be remedied by charging the furnace across the ends as well as the sides; but there are many structural difficulties in the way at present.

Various slopes were tried on the feed plates—from 22.5 degrees to 35 degrees — and we have noticed that we get the best results with an inclination of 12.5 degrees.

Recent Metallugical Innovations

There are several features in connection with the metallurgy of the plant which may be of interest, particularly in relation to the work that is being done at present.

The percentage of lead in the charge has varied greatly in recent years, being as low as 12 per cent., while at present it is around 28 per cent.

There is very little copper in the charge, and no matte is made.

We have a chart that shows the composition of the slag, plotted from monthly averages since 1903, and it is interesting to follow the various elements through and note how the smelter has had to follow the changes in ore supply.

The silica, which used to be 30 per cent., and the iron 20 per cent., have now changed places, and a similar phenomenon can be observed with the lime and the zinc.

It will also be observed that during 1919-1920 the sulphur in the slag was high; since using granulated slag this has dropped off very considerably, in spite of the fact that the zinc has increased more than 50 per cent., in

the slag. This is due to better roasting and to the fact that there is a greater charge, which is shown clearly in another way by a study of the change in analysis of the fume caught by the lead furnace Cottrell plant.

In 1919 this fume contained about 60 per cent. lead and 9 per cent. zinc, while at present it assays less than 40 per cent. lead, and the zinc has gone up to 35 per cent., while the tonnage caught in the treater remains practically constant. Under certain conditions, this fume may be profitably treated in the zinc plant, the zinc content being entirely soluble in sulphuric acid, the residue then being returned to the smelter.

The residue received from the zinc plant contains approximately 30 per cent. excess iron over silicon dioxide, and as we have not been able up to the present to treat all this zinc plant product, we are in what most lead smeltermen would consider the happy position of having an abundance of this valuable flux. In an endeavour to increase the consumption of this material, tests covering periods of several days were made, in which the lime rock on the sinter charge was replaced by zinc plant residue, the idea being to produce a slag at the blast furnaces as high as iron and low in lime as we could with safety. The sinter produced was all that could be desired and the blast furnaces ran well with a very hot slag, the lime dropping to as low as 5.8 per cent. in some samples taken. The conclusions arrived at, however, were not too clear, and further work will have to be done in order to determine whether a minimum amount of lime is necessary in order to produce a slag reasonably free from lead. The following is an average analysis of the slag samples taken at three day run:

Silver	0.25%
Lead	2.45
Zinc	17.2
Silica	19.1
Iron	33.7
Calcium oxide	6.2

Hoffman, in his "Metallurgy of Lead," page 327, mentions several slags high in iron and zinc and low in calcium oxide, but as the lead is not reported it is not known whether these slags were clean or not.

Hollinger On "High"

By Alexander Gray

For the seventh four-weekly period ended July 7th, Hollinger Consolidated Gold Mines reported a profit of $517,895.82 at the rate of $6,732,645.66 — more than any other gold producer has ever done.

To mid-July the company had made a profit this year of $3,552,865.26, had a surplus then of $5,737,125, and the liquid assets were carried on the books at $6,764,176.99. With 515,640 tons broken in the stopes ready for loading, tramming, hoisting and milling, and the total operating cost per ton milled, $4.3699 (including allowances for taxation and workmen's compensation), it is no disparagement of others to state that Hollinger is at a peak — for the greater milling capacity about to be provided and adequately supplied with power will mean another peak at greater altitude. For the time being, the official record for the first half of this year will suffice. It is as follows:

	To June 30	All of 1921
Tons Milled	665,115	1,072,493
Average Value per ton	$8.82	$9.67
Gross Value	$5,866,902	$10,367,901
Loss In Treatment	$ 198,175	$ 336,850
Net Value Recovered	$5,669,556	$10,031,050
Average Milled per day (ton)	3,959	2,938
Profits	$3,034,960	$ 5,091,659
Surplus	$5,465,385	$ 6,596,060
Cost per ton milled	$4.42	$4.87

Monthly Millings

January	111,206 tons
February	114,731
March	110,316
April	107,834
May	101,166
June	119,855
	665,115

At the June rate of crushing, if continued throughout the latter half year the company will have milled approximately 1,400,000 tons. The June gross value was over a million, and if [illegible] this will be maintained, in which event the company will report precious metals for the year worth about $12,000,000. If the working costs are no lower than they were to June, the gross profit for the year will be about $6,200,000. No longer is there more than a nominal premium upon the gold bullion. In 1921 the premium was carried in current operations, hence the grade of $9.67, whereas it really was a dollar or so less than that.

The half yearly showing means that the company earned at the rate of almost 25 per cent. on issued capital. Two other gold mining companies have crushed more than the Hollinger company. This year the Hollinger will take priority over New Modderfontein, and here is what Hollinger operations and profits look like by comparison with the Crown Mines at the Rand:

Crown Mines

	1921.	1914.
Average strength of labour force —		
Europeans	1,753	1,576
Natives	13,109	11,826
Footage developed	44,856	32,826
Tons milled	2,177,000	2,287,000
Per White employee	1,212.6	1,451.1
Per Native employee	166.1	193.1
Gold recovered (ozs.)	643,005	707,957
Working Revenue	£3,388,718	£2,975,088
Working Costs	£2,716,718	£1,784,079
Working Profit	£672,030	£1,191,629
Dividends paid	£305,531	£700,000

The industrial outlook in Australia remains unchanged and much unemployment continues. While about a year ago nearly 6,000 men were employed in the various branches of the Newcastle, N.S.W., steel plant, now the works employ about 800 men. The directors of the company have issued a statement that there must be substantial reductions in the cost of coal and wages before operations can be resumed to enable them to meet the competitive costs of oversea mills. In the meantime many orders for iron and steel products have been placed abroad.

News and Comments

By ALEXANDER GRAY

The Golden Harvest

The proper degree of perfervidy needs a halo, else devotional speculators are prone to falterings, backslidings in their "little faith". They adore an active, advancing market as dearly as Fauntleroy loved a lord—rather as Fauntleroy's grocer did. That elucidates why everything is set fair with Domes at $32, McIntyres at $19, and Hollinger at $10.60. The quotations and news from the properties supply that aurelian atmosphere without which the picture would not be so effective. It is taken for granted those prices will not remain stationary. Nor is it prudent to conjecture, during such good growing weather. Dome is paying 20 per cent. on parity and is alleged to be finding meteoric rock (as well as its excellent milling grade) veritably as rich as that of the Croesus. At times, during its daily crushings of between 4,200 and 4,500 tons, a wad of gold has greatly inconvenienced the Mill Superintendent by clogging the Hollinger rolls. McIntyre is credited with boulevard-wide ore in its deepest workings. Lake Shore has a bonanza section. Teck-Hughes is putting through $25 ore. There is buoyancy throughout with Dome shares (momentarily) at a premium of 220 per cent. on parity; McIntyres (temporarily) at 280 per cent. premium; Hollingers in flight, the present issue selling at 112 per cent. better than parity. McIntyre is ready for larger milling. Dome is redeeming its capital and handsomely rewarding shareholders who got in early and stayed. Hollinger shareholders, it will be recalled, have four for one of the original and the 100th dividend shortly will be disbursed. Meanwhile they have a market valuation equivalent to $42.40 per share, or about 750 per cent. on parity. Another disbursement on capital account is mooted for the Dome. How soon Hollinger shareholders will be permitted to dip into their bulging treasury, is likely to be decided later. Rumor has it an increased dividend is apt to come in a month or two. Perhaps there will be a Christmas Greeting of this sort. By then it will be ascertained what new power facilities and milling extensions are going to cost, when the enlarged mill will be ready, what width the wings will have from tip to tip. It is what is being done and what is planned at Porcupine and Kirkland Lake, that stimulates those who are going strong from Lightning River and the Hurricanaw to Matachewan and Shining Tree. Who could have foreseen what it meant to have Noah Timmins break ground at the Hollinger on January 1st., 1910? And have not "Jack" Wilson and W. S. Edwards earned more than is accorded them for finding the Dome?

The Cooke Geological Report

Locking the stable door after the horse has gone is what has happened in connection with the Dominion Geological Survey Report by Dr. H. C. Cooke. The damage has been done to the public. How much of the data presented was known to Larder Lake mining directors, and how far Dr. Cooke confided in them, is subject to surmise by modern Zaccheuses, up a tree. Dr. Cooke was quoted as having advised certain work and passed upon it. His admirable summary of the geological situation at and around Larder Lake, leaves no room to doubt what he actually thought about those sedimentary rocks—which were studiously acclaimed by Associated Goldfields sponsors. Associated Directors on more than one occasion stood for utterances of the most optimistic character. They increased the capital of the company from $5,000,000 to $30,000,000. Contrary to what was urged all along, Dr. Cooke, who had access to the drilling and development results, "puts the kibosh" on them. Mr. Hopkins of the Ontario Geological department, also saw what was going on. Despite the dum-dumming about huge lenses of profitable ore, Dr. Cooke (whose report might have been issued as a bulletin before so much money had been dissipated) says there is "absolutely no connection between the concentration of pyrite, the only sulphide in the rock, and its gold content." According to Dr. Cooke, it is a matter of porphyry, porphyry, who's got the porphyry—the proper porphyry!! The Associated Goldfields have never found it, to date. But what Dr. Cooke has rendered would have been more opportune when the Associated people had a million or so in the treasury and less nominal capital.

Quebec Areas Blossoming

Examinations in progress, options being taken, and reports of promising "finds" in Lightning River, the Hurricanaw and other localities, presage an appreciation of Quebec areas.

Mr. Schumacher Has the Money

The sale of the Schumacher property on the basis of 90 cents a share, or $1,650,000 in all, and of the "Schumacher" Veteran claim adjoining the Dome Mines for $400,000 were handsome rewards for those who took over those properties when the Porcupine fields were unproved. Needless to say, Mr. Schumacher never was entitled to an allotment of Veteran claims. He and a relative became interested in Porcupine in its earliest days. The Timmins brothers were taking title to the Hollinger, Miller, Dixon, Gillies, Middleton ground, and glanced toward the so-called "Schumacher", title to which was held by a Quebec Province widow. She had been proferred $500—"for the timber on it", as the adroit would-be purchaser put it.

For a day or two it seemed as though the price was attractive to her. Then Henry Timmins tendered $10,000—and that was what the McIntyre could have been had for. The widow was favorably disposed. Mr. Schumacher not only was willing to give $10,000, but he also tendered "other good and sufficient considerations", as yet unknown. So Mr. Schumacher took the Veteran. He was prepared to sell it. As the Porcupine movement increased in momentum, Mr. Schumacher raised his price, and I have before me a telegram dated in the summer of 1911, stating:

"The Schumacher is offered us for $500,000 and twenty-five per cent. interest, Please wire your advice."

Needless to state, there was no justification for the terms. Further negotiations mollified Mr. Schumacher to the point where he would accept $500,000 and 750,000 shares. He would not take $400,000 and 750,000 shares; consequently the deal fell through.

Mr. Schumacher was approached by others. He was "gun shy", however. Some financing was done; it cannot be said that development sustained the optimism of the chief owner, and the mill that was built did not enrich him. Mr. Schumacher was unperturbed. Periodically,

dickering was mooted. More financing was contemplated. Sooner or later one corner of the property was bound to be eligible, and now it is known the Hollinger control coquetted with Schumacher for a year, before what its owners thought it was worth thirteen years ago, was more than realized. Mr. Schumacher has no reason to complain of his speculative investment of $10,000.

What the other "Schumacher" Veteran claim north of the Dome Mines cost, now would be a misdemeanor punishable with fine or imprisonment, or both. Schumacher and père-in-law bought it when the "Foolish O'Brien", Feldon, Lemberg and contiguous areas were so many suspects. Not even the Dome Extension and what became the North Dome was christened. "Ken" Rose had his notions of the Lemberg dissipated. Dr Simon shattered the tablets of Moses after coming all the way from London to inspect the Feldon on behalf of the Hamilton-Ehrlich interests.

The years have not obscured what occurred to the North Dome, fathered by the Cartwrights and foundered under Temiskaming ownership. Meanwhile Fred. Connell put some of his Connell Veterans' profits into an almost half interest in the "Schumacher" veteran claim—the other half being in the Schumacher family, where the control barely rested. That "barely" factor was enough to keep Mr. Connell upon the fence until he developed protuberances where respectable corns ought not to be. Mr. Connell's spirit was willing—but the Schumacher flesh was weak. Rather than promote a lump, Mr. Connell sold his interest for less than he paid for it—and now familie Schumacher get $400,000 from the Bickell party. Manifestly "Lady Luck" in plumage has been perching for thirteen years or so upon the Schumacher roost.

Nipissing Company in Kirkland Lake

Playing for position is becoming more than a pastime with important mining corporations. This is a phase of reproductive investment that should prolong and broaden the interest in Ontario mineral industries. Comagas spread its net. It did not gather much fish thereby, but it continues to try, and one of these days will land a large one. Nipissing besturred itself in several directions, overlooking no points of the compass. La Rose likewise, and Kerr Lake, and the Mining Corporation. The list need not be extended. Beaver and Temiskaming might be included. All want a second helping if not a third or a fourth.

At the nascent [illegible] laid upon the advent of Nipissing which has entrenched an area immediately east of the Tough Oakes Burnside at Kirkland Lake, between those and the Gold Belt holdings. Being able to take choice of positions [illegible] of silver corporations, so far as Canada goes, like a wasp where it cannot get the breast, to beg, the dark meat is apt to be as nourishing. If the productive elements present to the west can be picked up short [illegible] people seek it, the recreative forces [illegible] will prolong their stay, and that would be encouraging.

[illegible]

Mr. Paul [illegible] comment about what appeared in this department [illegible] Compania Minera San Pascual De Las Adargas [illegible] he would not enthuse over the [illegible] the character of the Adargas literature [illegible] Canada. He assures us that "Adargas [illegible] and that being so it is the wish of [illegible] both shield and armor against many [illegible] removed. Our information as to the [illegible] entered at the time specified, came from a source that will not be questioned by reputable mining people hereabouts. No one doubts the merits of some of the antiguan properties of Mexico. The Adargas aggregation is altogether too seductive for indiscriminating investors. Canada can employ its spare cash more advantageously nearer to Home. And as for previous Ginther promotions (upon which he prides himself) there is no wish to recite or recall the experience of Canadians. Admitting the adverse effects of Mexican warfare does not obscure the losses incurred. Mr. Ginther profited thereby. Very few others have done so. To the contrary. There is no need to re-open wounds. We have no quarrel with Ginther schemes so long as Canada is not exploited further. At the same time there is no disposition to detract from the professional status of Messrs. Houston and Kirby. When they formally state that there is an "inexhaustible" supply of ore in the Adargas—as the circulars set out—more credence may be given to other representations. Mr. Ginther should keep his temper—and Canada should keep its cash within its own borders, pending more authentic information.

Hollinger Production "Over the Top"

Official results of Hollinger Consolidated operations for the six months ended June 30, are as follows:

Gross Production	$5,866,902
Recovered	5,669,356
Loss in Extraction	198,175
Tons Milled	665,115
Average Value per ton milled	8.82
Profit	3,034,966
Average cost per ton milled	4.39
Average daily crushing, tons	3,959
Monthly record of tons milled:—	
January	111,206
February	114,731
March	110,316
April	107,841
May	101,166
June	119,855
Surplus	$5,165,389
Current assets over	7,000,000

The story in tabloid needs no embellishment. With a recovery of approximately $8.50 (really it is a shade better than that) and costs coming down, a profit of $4.13 per ton applied on at least 1,400,000 tons should make the whole story of 1922 operations epoch making in the annals of gold winning.

It is no breach of confidence to state that operating costs have been as low as $3.85 per ton, of late. The June average daily crushing was 4,281 tons. Throughout two weeks the daily average was 4,500 tons. It is confidently anticipated by the management that with slight modifications in the mill the daily crushing will be brought to 5,000 tons, which will be a stopping place until the new power supply is available and the ultimate objective of 7,000 tons is attained.

If the June rate of production is maintained during the second half of this year, then the 1922 production will look something like this:

Six months to June 30	$5,866,902
July 1 to December 31	6,337,435
	$12,204,337

Allowing $400,000 to cover losses in extraction, even if the final months of the year do not notify greater crushings, the company will have recovered about $11,800,000. Of that, according to first half year costs, 52 per cent would be profit, or $6,136,000. But the profit

factor will be greater, as costs are at or less than $4; so, if the grade is continued, the company may earn a profit of $6,300,000, or 25.6 per cent. on issued capital. In reality twice the present dividend requirement is being earned.

Were the policy of the company otherwise, this fact would be exploited, along with the amplitude of the surplus, for market effect. In the last week in June, the profit earned was $146,188.38, which was at the rate of $7,601,000 per annum. As it is not improbable that the final months of the year will permit of greater than June crushings, all that need be stated is that the Company will beat the New Modderfontein return and take the world record for gold outputting. Already Hollinger workings are being carried into the Schumacher property, and it is a certainty that all power difficulties will be solved. Maximum crushings cannot be accomplished until some time next year.

Meanwhile, as General Manager Brigham has shown what mining and milling efficiency means to the Hollinger, a decision will be reached in the course of a month or so regarding additional mills to supplement and eventually to eliminate the stamps. Experience has shown beyond question that stamps are relatively inefficient, all contentions to the contrary notwithstanding. And as to the mining outlook, Mr. Brigham the other night did some post-prandial word-painting. The occasion was a dinner given by the Ontario Mining Association, and there was an interchange of optimistic sentiments. Mr. Brigham, who is nothing if not enthusiastic about his mines and their possibilities, indulged in hypothesis concerning what may happen if the Hollinger sections continue as they were and are down to 3,000 feet vertical. Each one hundred feet of his mines thus far has accounted for $1,500,000. When Mr. Brigham is able to make report and to proudly remark: "Quod erat demonstrandum", it is to be hoped he will have more than laurels about his personality. For him to even hypothetically forecast a production of $450,000,000 from the properties, if the various vein series extend in widths and values to the depth stipulated, is a perfectly valid argument why the Hollinger Company must have power facilities conforming to the policy of the company. To a certainty he is aiming to get all there is in the ground, without prolonging the life of the mines by remaining content with a crushing representing $12,000,000 per annum for 37 years.

Teck-Hughes is Up-Stage

Heartiest greetings are due to Mr. Forbes on his success in staging a most auspicious come-back for the Teck-Hughes. Where there was a most disconcerting situation somewhat detrimental to the locality, there is now substantial evidence that while a good mine can make a fine manager, none the less is it trite that a good mine manager can straighten out the affairs of what looked like a doubtful mine. Mr. Forbes inherited conditions that would have deterred most managers not in need of emergency occupation. He had to re-adjust the company finances and make his mine protect new financing. That he has accomplished this, the improved mining position and the milling returns demonstrate. His July results were record-breaking so far as Teck-Hughes is concerned. The reported recovery of $25 per ton milled may not be maintained throughout a longer continuous milling period, but the grade can be accepted as proof that Mr. Forbes thinks the mine can afford it. Work on the 600 and 730-ft. levels has given the Teck-Hughes management inspiration, by reason of a supplemental ore-body. The fact that the shaft is being carried to 1,000 feet bespeaks more than Mr. Forbes cares to intimate. He rests his case upon the statement that he is "out of the woods."

Why not Canadian Coal?

An emergency exists. A greater crisis may arise. All the municipalities are clamorous for Welsh coal. Ottawa finds solace in the thought that what it can bring from Wales can be retailed at "less than $20 to ton!" Possibly the difficulty will be abated by the settlement of the strikes, and yet it might be possible to give our own western fuels more of their own markets—for a change.

Guarantees East and West

Newfoundland's Premier went off to Westminster, leaving word that he aimed to secure a guarantee from the Imperial Government of a bond issue for the benefit of those who would develop water powers and pulp areas, incidentally helping out mining interests. It is also stated that the Coast Range Steel promoters expect the British Columbia, Dominion and Imperial authorities to guarantee a $4,000,000 bond issue. In both those propositions there may be real merit, and yet there are invidious elements that suggest more mature deliberation or broader treatment. Peace River claims to have unearthed large iron deposits close to coking coal. Other districts would create iron-mining activity. The recent Ontario conference crystallized sentiment in behalf of this basic industry, but piecemeal support would be more patch-work. Nor are special privileges always permanently constructive. For their effect we need not look further than the experience of the Imperial Government in the matter of a nickel company. A modicum of protection, or a bonus for pig iron production, might be more to the national purpose than guarantees for the few—and "the devil take the hindmost."

Half-a-Year at the Dome

During the first half of the current year Dome production averaged $329,247 per month, as compared with $197,006, these being the details:

	1921
April	$153,170
May	185,551
June	198,777
July	191,678
August	210,924
September	241,935
	1922
January	$305,433
February	302,751
March	312,000
April	377,438
May	325,328
June	351,531

The respective grand totals were $1,975,481 and $1,182,035. An increase of over 67 per cent. is a producing record that will do—until there is a better one.

To this list can be added 335,754 for July.

Encore!

Pittsburgh, August 5. — A. P. Theurkaf, chief engineer of British Empire Steel Corporation, is in Pittsburgh to purchase $4,000,000 equipment for additional units and plant repairs. According to Mr. Theurkaf, British Empire Steel is operating at 75 per cent capacity. He says Canadian mills can produce steel cheaper than Pittsburgh mills.— (New item).

Some Geological Reconnaissances

The *Summary Report*, 1921, *Part D*, of the Dominion Geological Survey is now available to the public. It contains a number of reports of interest to the mining fraternity and particularly of interest to prospectors.

An Exploration of Thunder Bay, Ontario

In this report of six brief pages, Dr. T. L. Tanton tells of a reconnaissance survey into an area, quite close to Lake Superior, that has not before been mapped, and was at the time of his visit (the fall of 1921) unprospected. The rocks encountered were the basal schist complex, usually referred to as the Keewatin series, which were found developed only in small areas; granite rocks, which comprised most of the area examined; Keewenawan sediments—conglomerate, sandstone, red volcanic ash, and limestone—lying horizontally upon the former rocks; and Keewenawan irruptions—dykes and sills of diabase cutting all the above rocks.

Dr. Tanton draws the attention of prospectors specifically to certain mineral occurrences and geological features that he considers worthy of close attention. In locations that he specifies there are actual deposits of molybdenite ore, galena and argentite that have not yet been investigated. He also recommends the prospecting of faults at or near the numerous large diabase dykes, and along the course of late Keewenawan veins, a number of which were observed during the course of the survey, especially along the route between Loon and MacKenzie lakes.

Dr. Tanton is engaged in an extensive survey of the north shore of Lake Superior, and has already spent several field seasons on the work. The present report describes merely an incident.

A sketch map to illustrate Dr. Tanton's lucid text would have been a welcome and useful addition to this little report.

Investigation of Peat Bogs in Ontario

This report, by Mr. A. Anrep, peat expert for the Geological Survey, has already been summarized in the *Canadian Mining Journal* on June 9th. Mr. Anrep's surveys have delineated potential fuel reserves of a magnitude realized by few Canadians, and the next report, *Synopsis of Information Concerning the Peat Situation in Canada*, gives in five pages a resumé of results to date. The total available fuel existing in the 105 bogs surveyed is 190 million tons.

Goudreau Gold Area, Michipicoten District, Ontario

An abstract of this report appeared in the *Canadian Mining Journal* in May 1918, as well as a subsequent report from Mr. Ellis Thomson who is in the Goudreau field again this summer.

Derochie, Hodgson, Goudie and Shields Townships, Timiskaming District, Ontario

Sir Stopford Brandy's [illegible] report on this area shows that the deposits of [illegible] in which there was so much interest shown last summer, are not at all likely to be of economic value. They are composed characteristically of pockets of [illegible] in fault zones. Three old "mines", the [illegible] and Quitside (lead) and the Superior (copper) were examined, but no justification for the extensive [illegible] was discovered.

Wanapitei Lake Map Area

This report, by Dr. F. T. Quirke, is mainly concerned with a study of the [illegible] relations of the sedimentary rocks of the [illegible]. It extends the area studied by Dr. W. H. [illegible] and subsequent years, which led to a better understanding of the early sedimentary rocks of Ontario [illegible] much simpler classification, as well as to the solution of numerous geological puzzles. The "nickel range" extends into the western part of the map-sheet, and iron formation, previously described by Dr. W. G. Miller, occurs on the east side.

The area contains a number of gold prospects, on which exploration still continues in spite of discouragement due to erratic values. Mr. Quirke recommends intensive prospecting for gold along fault lines close to diabase intrusions, and instances a number of such faults worthy of attention.

Radium-Bearing Pegmatites of Ontario

In this report Mr. H. V. Ellsworth describes the various known occurrences of radium-bearing minerals in Ontario, all of them being in pegmatite dykes. The general conclusion is that "the pegmatites of Ontario "undoubtedly contain, in the aggregate, a relatively "enormous amount of radium and thorium minerals, "but these occur in a widely disseminated condition, "and, to the writer, it appears improbable that rich "concentrations will ever be found in commercial amount in this type of occurrence". Mr. Ellsworth adds a suggestion that, by submitting ground feldspar to a process of concentration, impurities such as magnetite, ilmenite, pyrite, tourmaline, black mica etc., might be removed, along with radium-bearing minerals, and that the last might, in certain cases, be profitably recovered.

Geology of Lemieux Township, Gaspé County, Quebec

In this report of 26 pages, including two geological maps, Dr. F. J. Alcock describes briefly a series of zinc-lead deposits that give promise of being to Eastern Canada what the famous Sullivan mine is to the West.

The Federal Zinc and Lead mine is in the heart of the Gaspé peninsula, and is reached by a wagon road, 45 miles long from Caseapedia, on the Bay Chaleur and the Quebec Oriental railway. The geology of the map area examined by Dr. Alcock shows the following succession: Shales and limestones of Lower Devonian age have been much folded and faulted and intruded by igneous rocks. Over these is Gaspé sandstone associated with basic volcanic flows, which covers most of the map area. Intruding all these rocks, probably in Middle Devonian times, are granite and syenite.

The veins occur in shale and limestone, close to intrusions of porphyry and syenite. The sedimentary rocks have been much faulted and brecciated, and there is so much sphalerite and galena in some of the brecciated zones that it can be counted as ore.

A number of the veins have been stripped for a length of 500 feet or more, and underground development has been carried to a depth of 260 feet. Outcrops on the hill side show that the veins at a vertical distance of 360 feet below the summit have the same favourable characteristics as those developed; and all evidence points to their persistence and value to a great depth.

Only a small part of the mineral-bearing area has been explored so far, but this has disclosed half a dozen veins of first rate importance, many smaller veins, and brecciated zones up to 60 feet in width, much of which can be considered ore. Some time ago Dr. Walter Harvey Weed examined and sampled the deposits and reported an average content in the Federal vein, one of the principal veins developed, of 3.8 per cent. lead and 7.9 per cent. zinc.

The ore is not at all complex, and is amenable to the simplest methods of treatment. The present handicap is a lack of good means of communication.

Mr. T. O. Lyall is president of the Federal Zinc and Lead Company, and Mr. J. C. Beidelman is vice-president and general manager.

Notes From Nova Scotia

THE DEPARTMENT OF MINES AND THE COLLIERIES

It has been the opinion of local mining men for a long time that the annual report of the Mines Department at Halifax should be made more comprehensive, and should give more general information about the conditions of mining in the different districts, the difficulties encountered and overcome, and the work of meeting and solving the new problems of coal mining as they arise. The efforts of the Government Mine Inspectors in enforcing the law upon the operators and workmen alike, the new methods of mining introduced because of changed conditions, and the many other matters that are being dealt with as the mines develop and go deeper, should in some way be publicly recorded.

More Publicity Desirable

It might not be prudent to go too much into detail, but a little more information than we are now getting would be welcome. There might be some things the Mines Department would be inclined to censor from the reports of their Inspectors, but they do not need to cut them all out. The public can stand knowing a whole lot more about mining conditions without getting unduly disturbed over them. Indeed, if they knew more, there would be much less criticism by ranters and men of destructive tendency. However we may view it, there is a general lack of information in the mines report, and while we do not wish to attribute the cause to any negligence on the part of the Mines Department in gathering information, we believe there is much unwisdom and niggardliness in distributing it.

The Public, as Owners, Should Know More

It may be argued that the Government, as owners of coal areas leased to others, is not at liberty to expose information that would be inimical to the interests of those operating these properties. Nobody wants them to give away any business secrets that would jeopardise the coal industry. But coal is the property of the people, and they ought to know what means are being taken to conserve the coal fields and win the largest possible amount of coal from every working seam.

It may be further contended that all plans showing projections of new work must be approved by the Mines Department before they can be carried out. This is quite true; and while the carrying out of those plans is the only proof we now have of knowing that the Department did approve them, there is nothing in the reports to show the reason why plans were approved. For instance, a colliery is closed down, as happened at No. 9, and the men are transferred to the lower seam. If the Department follows out its usual course, no statement will would be made at the end of the year showing why this was done. At the same time it is well known that the bulk of the men in that district firmly believe that the Dominion Coal Company for sinister purposes made this change. If it were known that an explanation would be made by the Government as to why this mine was shut down, there would be less suspicion, less distrust, and less criticism.

Miners Should be Informed

Again, when new conditions arise, causing a change in the methods of working, which change is sometimes irksome to the miner, the reason for the change should be openly stated and the mining population should have confidence that the Government has full information, enabling them to determine whether or not the change is in the best interests of the industry.

Within the past ten years great changes have come over the mines of the Province. Under sea work has become so general that seventy per cent, of Nova Scotian coal is mined from this source. The Pictou coal fields have passed through an experience with spontaneous mine fires, which have been courageously met and successfully overcome. The Cumberland collieries, especially Springhill, have reached a depth at which their methods of mining have had to be changed. We do know that the Government were most deeply interested during all this time and tried to procure information from the best sources for the purpose of giving the greatest possible help. But they have failed to make this known, and in so doing have left the public to believe anything any thoughtless agitator may conjure up from the depths of his imagination.

Mine Inspection Needs More Publicity

Then again, what does the public know of the work of the Deputy Inspecters? There is nothing to show that these men visited any colliery during the year; and were it not the fact that some of us know that they do inspect the collieries of the district, we would never know it at all.. Does not much of the criticism which is levelled at thse men arise from the case just stated, viz., that there is nothing in the mines report over their signatures except a general statement showing machinery, material etc., of the coal mines? This is unfair to the Inspectors, to the Mines Department, to the miners, and to the public. Surely their work will stand scrutiny. Why, when a Deputy Inspector enters a mine and finds dangerous conditions and reports these, and makes suggestions, do they not appear in the annual report? And if on the next visit the Inspector found the danger had been removed or that it still remained and is again reported, why is this not published at the end of the year? It would show at least that the Inspector was on the job. It is the only way of seeing the Inspector at his work, and it is one of the things the miner, if not the general public looks for.

A Monthly Report Suggested

The answer may be made that mine visits of the Deputy Inspectors are so frequent that it would entail a large amount of printing and make a report too cumbersome. But a monthly statement, as now, is all that would be necessary and this could be sent out at the end of the year. We know that in the United States, Inspectors have much larger districts to cover and cannot visit them as often as is done by our own Inspectors in Nova Scotia; but their reports show their visits and what they have found and reported. Smaller districts make mine inspection in our Province all the better, but a short resumé of the work done and the collieries visited within a month would be sufficient, except in special cases such as have been referred to. This would counteract the impression that Government Inspectors are more for ornament than for use. The writer happens to know some of these men intimately, having worked with them in the mine and elsewhere, and he does not hesitate to state that they will faithfully do their duty whatever happens. They are conscientious, courageous men with long experience in coal mining. They are in sympathy

with the mining classes not anxious to do all in their power to help them. At the same time they are not blind to the weaknesses of the miner. They know that they are at times prone to take the way of least resistance, and when this course is pursued in violation of the law, then duty impels them to take action that does not tend to popularize their reputation or the Mines Department. However, it is to the credit of the miner that generally he recognizes the necessity of obeying the mining laws and in many cases gives active support to having these enforced.

The Inspector's Duties

The work of the mine Inspector is hard and dangerous, and when a mine explosion or a mine fire occurs, his task calls for the greatest courage. Indeed, men who constantly travel alone through the old waste workings of any colliery are in constant danger. This is so generally recognized that mine examiners travel these in pairs. These old ways are off the beaten track and men have been known to be injured when alone by falling rock and held under it for a long time before they were discovered. Every part of the mine must be inspected and reported to the Department and the Inspector who undertakes to travel and inspect a district of any size in Nova Scotia, is a busy man. It is part of the purpose of this article to show the Inspector in his true light, and also to help the Mines Department to see its reports as others see them.

Difficulties in Mining Nova Scotian Coal

The coal mines of Nova Scotia are difficult to operate. Nearly every problem known to coal mining has been met and either solved or is in the process of being solved. Contorted seams lie at heavy angles in Cumberland. Thick seams and spontaneous combustion are the bane of Pictou collieries. Cape Breton has been more fortunate but the process of erosion over many centuries has despoiled the Island of much of its natural wealth before cruel man discovered it, and in future he must penetrate far under the ocean bed to win a portion of what it left. The [illegible] problem is not the least of the many difficulties confronting the mining industry of Nova Scotia.

In the course of the [illegible] life of the Province its collieries have passed through [illegible] experiences of mine fires, floods and explosions. The factors that caused these [illegible] are still present and nothing but great care on the part of the companies operating and the Mines Department supervising, will prevent a [illegible]. Let us then have the work of the Department [illegible] in a way that will show what is [illegible] and the public will be less inclined to [illegible] to grow popular by criticising a [illegible] duty is being made to help the great key [illegible] of Industry.

[illegible] DISPUTE

A conference [illegible] United Mine Workers and the Dominion Coal [illegible] took place last Saturday. The result [illegible] the hope that springs eternal in the [illegible] been received, and there is a general [illegible] conclusion could only come out of the [illegible] anxiously look for a speedy settle[illegible] of a conservative mind fail to see [illegible] Among these latter are men who seem to [illegible] Coal Company has sold its output for the year at the low competitive prices of early summer. These are much below last year's prices and no increase can be granted, much less a return to the wage rates of 1921, the highest known to this Province.

If this be true, then the Coal Company is not in a position to take advantage of the rising market, due to the American strike. This may seem unfortunate, but business cannot be conducted along the lines of accident. It must have some basis of stability and the securing of coal contracts early in the year was good business. It may be difficult to persuade the workmen that increased coal prices are not being obtained. In this case, contract prices should either be made public or made known to the miners' executive. It would help the labor organizations to see just how hopeless their case is. It would also go to prove that the railways and industries of Canada were profiting by the lower prices of coal. Once the Coal Company has placed its position before the public, it will be up to the mine workers to show cause why they reject it and why they threaten to cease work.

A Suggested Way Out

To bring on a strike when the whole continent of America is facing a coal famine, in order to force the hands of the Coal Company, may seem good strategy on the part of the labor organization, but it is not calculated to win the sympathy of a public with fireless homes and idle industries. Should a deadlock occur and continue, the Government will be forced to step into the breach to try to effect a settlement. They should do this before the deadlock does occur as everything at the present time points to a cessation of work at the coal mines. Indeed, the Government is partly responsible for the present mixup, for if they had held off their hands last winter when the agitation was on for a second Conciliation Board, we believe the United Mine Workers would have discovered that they were "in wrong", to use a slang term. They would have learned their lesson. But, having succeeded in moving the powers that be to act, we may well believe another attempt of the same kind will be tried, and they will again look to the Government for aid, which will not be denied. The country cannot be left to freeze and the industries to close down without an attempt to keep the mines running. A way may be found to help out the coal industry as was done in Britain during the war. It is not necessary that the mines be taken under Government control, but a bonus could be granted during the coal famine season. But this should be done in such a way as to prevent trouble when the bonus is taken off. This seems to be only way at present of bridging the difficulty. It may well be, however, that the country will be against subsidizing any industry, nevertheless it is the duty of Governments to solve the problems arising within their country, and this seems at the present to be a practical solution, and the only possible one in sight.

When the American miners' strike is over there is little doubt that prices will become lower and competition for Canadian markets will be keener and everything that is done at the present time must have in view conditions that are sure to come. If the Company goes now to add to the miners' wages there is nothing surer than that when the coal trade returns to normal the taking this off again would be the beginning of more trouble. But if this were given by the Government then no objection against the Company could be made.

CORRESPONDENCE

A *Proponent of "Adargas"*

To the Editor, Canadian Mining Journal.

Sir,

I have just had called to my attention the article that appeared in your Journal dated June 23rd, referring to the Cia. Minera San Pascual de las Adargas S. A.

The amusing article in question was written, I understand, by Alexander Gray, but as I do not know where to reach him, and as I presume that you endorse all that is published in your paper, I am writing you on the matter of the article, in so far as it refers to me and to the Adargas mines.

With regard to the Adargas mines, I will only say that the author of the article evidently belongs to that somewhat extensive tribe of "*Know-it-alls*" that never do anything themselves except criticise others. I am surprised that he does not know sufficient Spanish to understand that "Adarga" means a shield, and the name of "Adargas" was given to the mines because Mexican Indian shields were found in the workings of these old mines years ago when they were reopened. True records exist proving that the Adargas mines were being worked long before a single pound of ore was ever mined in the whole Dominion of Canada.

The well-known integrity and professional reputations of Engineers Houston and Kirby speak for themselves, and although their experience probably does not include Africa, nothing Alexander Gray or the Canadian Mining Journal may say or insinuate can hurt them.

The Adargas mines have been worked for over two hundred years, as the vast amount of old workings, shafts, tunnels, etc., fully substantiate to any competent miner, and nothing the Canadian Mining Journal may say or insinuate can overcome the fact that these mines were always heavy producers of good ores, as all the smelters in Mexico, to which many thousands of tons of good ores were sold, can testify.

Where do you get that stuff about the Adargas Company planning a small mill?

The statement that the mines were not de-watered two months ago is a downright mis-statement (to put it mildly), and for your information I will say that the mines were de-watered over a year ago, precisely to show the people in Buffalo—Dr. Wettlaufer, Mr. Schoellkopf and "the formidable advisory Board"—that the large bodies of high-grade ores existed everywhere that the old Spaniards and Mexican miners left off working. These Buffala people were doubting Thomases like the Canadian Mining Journal and wanted to be shown before putting up their money for a railroad, 50 mile electric power transmission line and complete modern equipment in every way, which equipment is installed and in operation, ready to handle 500 tons of ore per day, as soon as the railroad is completed within a few weeks.

No Canadian mining engineer, either prominent, popular or otherwise, has visited the Adargas mines within the last six months. The only Canadian who has been at the Adargas recently is Mr. Poirier, who I have no doubt is respected and popular, and who called on Mr. Houston at the Adargas and stayed long enough to take a meal and a drink, but who saw nothing of the mines.

Either Mr. Houston or I will be pleased to show Alexander Gray or anyone else from the Canadian Mining Journal on the ground:—

First That the mines are de-watered.

Second That the large bodies of high-grade ore are visible, subject to examination and sampling.

Third That the mines are fully equipped to handle five hundred tons of ore per day, or more, as we have sufficient electric power to handle several times that tonnage.

Fourth That our standard gauge railroad is practically built and will be hauling ore shortly.

Fifth By investing one dollar in stock of Adargas, the books of the Company are open for inspection to show that the Company does not owe a single cent to anyone, nor are there any notes or bonds outstanding.

Your remarks about the seasoned promoter well known in Toronto circles is incomplete.

I have promoted two Mexican enterprises partly with Canadian capital, and am very proud of them both. The first promotion was the Mexican Northern Power Co., which constructed one of the largest dams in the world, forming the largest artificial body of water in the world, for the generation of electric power, which power is today being used in the mining camps of Parral, Minas Nuevas, Santa Barbara, San Francisco del Oro, El Rayo and Adargas, and will shortly be in Chihuahua City, Santa Eulalia and the Julieta mines. Were it not for this promotion of mine, it is probable that not a wheel would be turning today in the camps mentioned, while at present many mines are being operated, many thousands of tons of ore are being treated daily, and many thousands of miners are making a living, producing gold, silver, lead and copper.

Furthermore, the Governor of the States of Chihuahua has recently made a contract with the Mexican Northern Power Co. whereby the State acquired the water after it leaves the turbines and will irrigate something like three hundred thousand acres of land, thereby converting that much practically desert land into farms, and enabling many thousands of human beings to make a good living *for ever and ever*, much longer than the memory of Alexander Gray will last in Canada or Africa. This promotion of mine is a real benefit to mankind and I am really and truly proud to have had the vision to conceive it, promote it and carry it to a successful finish.

While the Mexican Northern Power Co. did not make any money during the several years of revolution in Mexico (not the fault of the promoter) this Company is now in first-class condition, making big money and will make more as time goes on.

Again I say I am proud of this, my first promotion with Canadian capital. Did I make any profit out of it? of course I did. Do you think I was entitled to any?

My second promotion with Canadian capital, the San Patricio Mining Co. of Parral, Chih., Mexico, owns the "San Patricio" and adjoining mines, are fully equipped with o first classs modern cyanide mill, which is running full milling capacity and earning good profits, and will do so far many years to come. I may also say here that the "San Patricio" mines were being worked long before Canada produced a single pound of ore of any kind, and probably will be producing good ore after most Canadian mines are only memories. I am also proud to have promoted this, my second promotion with Canadian capital.

With respect to the "Promoters" for whom Alexander Gray, and I presume the Canadian Mining Journal, have such contempt, I may say that if it were not for them having the courage to put in their work and money at the start to promote new enterprises, there would be very few properties operated, very little need for any mining Journal and a good deal less for any Alexander Grays.

I trust you will in justice, publish this letter, in answer to what I look upon as a very careless article published in your Journal on June 23rd.

Yours, etc.,

Paul Ginther

El Paso, Texas. July 27th, 1922.

British Columbia Letter

Collieries working at Capacity

The collieries of Vancouver Island are working to capacity. For weeks after the strike in the United States started there was little effect on the business of the operators of this section but recently the pressure has been felt and the active companies of British Columbia now are in the position of having their entire output taken up and finding it necessary to turn away buyers.

The Canadian Collieries (D.) Ltd., producing 3,000 tons a day, is unable to meet the demand. Of this 1,000 tons is being taken by the Canadian Pacific and the Northern Pacific Railways. For the first time in many months the Company's coke ovens at Union Bay are in action, turning out 60 tons of coke a day for the Trail Smelter, Consolidated Mining & Smelting Company. Usually Trail is supplied from Fernie, by the Crow's Nest Pass Coal Company, but that source has dried up because of the strike extending throughout District 18 (U. M. W. of A.), which includes the eastern fields of this Province and the western parts of the Province of Alberta.

The Canadian Western Fuel Corporation, Nanaimo, is furnishing 1200 tons a day to the Great Northern, Union Pacific, and the Canadian National Railways. This and the smaller companies of the Island are turning out all the coal possible, without having difficulty in disposing of it. In Victoria, Vancouver and other Pacific Coast cities the situation is receiving much newspaper publicity and the people are being advised to lay in their winter supply, as some operators are predicting that the shortage later on will be so pronounced that the government will be forced to ration domestic fuel supplies.

The production of the Washington State mines at present is negligible.

The Coalmont Collieries, Ltd. (Coalmont (Nicola Princeton Field)) is producing about 800 tons a day and preparations are being made to bring the total to 1,000 tons. Most of this is being taken by the Great Northern, Canadian Pacific and Kettle Valley Railways. As development proceeds, it is predicted, a means will be found of doing away with the three-mile aerial tramway which provides transportation between the mine and the railway terminal. This will be done by the construction of a railway spur to the mine portal, a tipple and washery to be installed there and the coal delivered on railway cars direct. Hydroelectric power will be obtained to assist in the development and operation either by an extension of the West Kootenay Power and Light Company's transmission wire south from Princeton to Coalmont or by an independent installation on Granite Creek on the Tulameen River.

The Princeton Coal and Land Company is operating three new mines in preparation for the winter demand. One of these has been found to contain the best coal yet mined.

First Aid Contests for Labor Day

At a recent meeting of the Advisory Board of the East Kootenay Mine Safety Association plans were completed for the Mine Rescue and First Aid Contests to be held at Fernie, B. C., on Labor Day, September 4. The competitions will be in Mine Rescue Work, Senior First Aid, Ladies, and Junior First Aid.

W. R. Wilson, President and General Manager of the Crow's Nest Pass Coal Company, gave a dinner to the teams that took part in the contests held at Banff, Alta., on July 1st last. The Mine Rescue Teams of Fernie and Michel were congratulated for winning out against the best of the Province of Alberta and the Michel First Aid Team similarly felicitated on their fine showing.

New Trail in Portland Canal District

A reconnaissance trip has been completed by George Clothier, government mining engineer, over the Bear River-Naas Trail in order to obtain information as to the feasibility of constructing a prospectors' trail from Port Alice to the town of Stewart. Mr. Clothier says that work will be started this year, the route having been found practicable, and that it will be located as close to the 2,000 foot level as possible to ensure its being kept within the mineral belt. When this and other government plans are completed there will become accessible some 400 square miles of mineral-bearing territory.

Much Activity in Portland Canal District

There is more real mining activity in the Stewart District this year than ever before, states George Clothier, government engineer. The Premier is producing largely and steadily, about 200 men being on the payroll. There is development work employing from 10 to 15 men on each of several mines. These include the Divide Group, Superintendent Grant Mahood; the Big Missouri, Superintendent H. Howson; the B. C. Silver, of the Selukwe Gold Mining Co., C. A. Banks, manager, and H. Howson, superintendent; the Indian Group, of the Indian Mines, Prince Rupert, G. B. D. Turner, manager, and Roy Clothier, superintendent; the Prince John and M. C. Groups, being opened up by C. A. Mackenzie. On the Alaska side there are being developed on a similar scale the Alaska Premier, superintendent H. Tanner and the Fish Creek Mines, superintendent W. R. Forsyth. In addition probably a dozen properties are being developed with two or three men. Assessment work is being done on many prospects.

At Alice Arm there is not much movement besides at the Dolly Varden. However the Esperanza Mine is being worked while there are quite a few prospectors in the field.

Premier Producing 300 tons a day

R. W. Wood, president of the Premier Gold Mining Company, is visiting the mine. He is quoted as stating that the property now is producing about 300 tons of ore per day including mill feed. This ore has so far produced approximately 9,000 tons of metal.

Silversmith Pays Dividend

The Silversmith Mines Ltd., operating the old Silver Star Mine, is back on a dividend paying basis having distributed $25,000 for the quarter ending June 30, 1922. The last previous dividend was paid at December, 1920. The mine is producing silver, lead and zinc and is out both mine and ore dressing plant are in better condition than at any time in the past. More than two million dollars [illegible]

dends from the profits of the same property when known as Sloean Mine.

Annual Report of Howe Sound Mining Company

The Howe Sound Mining Company's Annual Report, just issued, shows an operating profit of $228,044.40 for the year 1921. This was made from the Company's Mexican properties, the Potosi Mining Company and the Calera Mining Company. The Company's British Columbia Company, Britannia Mining & Smelting Company, did not operate last year because of the destruction of the plant by fire. It is shown by the report, however, that 46,443 tons of ore were broken at the Britannia Mine during the year. This would indicate that plans are in hand for active production as soon as the 2,500 tons mill, now under construction, is completed.

To Test Placers in Bed of Tulameen River

An earnest effort is being made by Capt. Cates, a nautical man with some years of practical experience as a miner, to control the waters of the Tulameen River, sluicing the bed and recovering the riches it is supposed to contain in gold and platinum. He has constructed a dam that has stood the test of high water and, with other necessary equipment purchased and on the ground, seems on a fair way to reaching a point that will permit a thorough trying out of the theory he and many others hold regarding the wealth of this turbulent waterway. Two other companies are installing hydraulic plants. A considerable amount of platinum, derived from Olivine Mountain, it is said, has been found in the Tulameen. It has been picked up in the form of float, containing platinum, gold, copper, microscopic diamonds, and chromite, and is a thing by itself in the geology of the country. Analysis of a sample from Granite Creek shows it to carry palladium, rhodium, and osmiridium, as well as copper, chromite and iron. Nuggets of platinum have been obtanied from the Tulameen weighing half an ounce.

Progress at Britannia

Concrete work for the new mill of the Britannia Mining & Smelting Co., Howe Sound, is half completed and a start has been made on the steel erection for the fireproof mill building. Cranes, hoists, concentrating and screening machinery have arrived and the rest of the plant is expected in August. The electric railway has been extended for the transportation of supplies, and the concentrater storage bins, which will hold about 10,000 tons, are being built. Many new homes are being built for employees. Much development work has been done in the mine. The Victoria and Amy adits are now working, having been opened for the first time this year. Three levels have been driven, a shaft sunk to the 2200 level, and nine ore shoots developed by drifts, each with a good showing of ore. The ore will be raised to the Victoria level, whence it will be delivered to an ore-pocket from which it will be taken by aerial tramway to the 1600-foot or Empress Tunnel, which is provided with a 3-foot track and electric transportation. Through this tunnel the ore goes to the crushers, whence it is delivered on the 2200-foot or main haulage level and thence taken by rail to the mill. A camp is being built at the Victoria adit, one of its features being a sawmill with a capacity of 25,000 cubic feet of lumber per day.

It is reported that the Canada Copper Company, with extensive holdings at Copper Mountain and a mill at Allenby, is being re-organized.

For the three months ended March 31 last the Belmont-Surf Inlet Mine produced a net operating profit of $18,804.66.

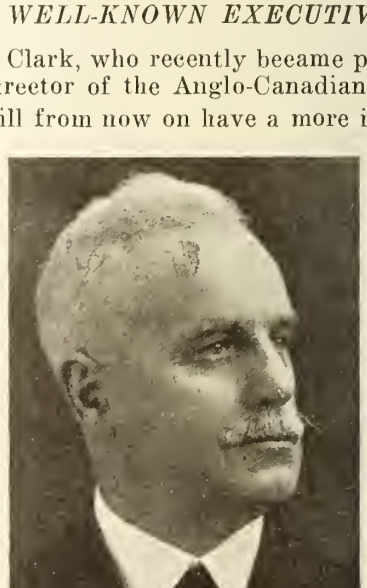
Pressure is being brought upon the British Columbia Government to back an Iron and Steel Industry. The British and Canadian Governments are said to have agreed to contribute one-third each of the capital involved, if the Province will guarantee the interest on bonds to the extent of the remaining one third. The policy of the Provincial Government has not yet been announced.

There are thirty-nine parties from the Geological Survey of Canada at work in eight Provinces and as well in the Northwest Territories and the Yukon. Ten of these are engaged on topographical mapping. In southern British Columbia a scheme of geological mapping is in progress with a view to the corrlation of the many isolated pieces of geological work already done, thus permitting the issuance of one general geological map of the area.

The Van Roi, Silverton; Gold Hill, Taghum; and Northport Smelting & Refining Company were three new shippers to the Trail Smelter, Consolidated Mining & Smelting Co., during the third week of July. Total receipts for the period were 6714 tons. Other shippers were: Sally, Beaverdell; Silversmith, Sandon; White Elephant, Ewing's Landing, and Company Mines. The latter contributed 6,272 tons.

A WELL-KNOWN EXECUTIVE

Mr. D. W. Clark, who recently became president and managing director of the Anglo-Canadian Wire Rope Company, will from now on have a more intimate con-



nection with the mining industry than in the past. He was formerly managing director of the Canadian B. K. Morton Company, manufacturers of tool steels in Sheffield. In that capacity he had already become known to many of the mining fraternity from Atlantic to Pacific.

Northern Ontario Letter

Dome

According to official figures to the Journal, the production of gold from the Dome Mines during the month of July amounted to $335,254 and was the second highest record at this time. The mill handled 31,900 tons of ore and established an average of 1,056 tons every twenty-four hours. The average gold content was a little under $11 per ton and resulted in a recovery of $10.55 from each ton of ore treated.

For the seven months ended July 31st the Dome produced approximately $2,280,000, with every indication that the income for the full calendar year will exceed $4,000,000.

Lake Shore

The annual meeting of the Lake Shore Mines was held Aug. 2nd. Plans announced for the future are that the shaft will be continued from the present 600-ft. level to a depth of 800 feet, at which point lateral work will be extended along No. 1 and No. 2 ore bodies. It has also been announced that the mining plant will be enlarged at once so as to provide facilities for taking out a larger volume of ore preparatory to enlarging the milling plant.

The net profit for the half fiscal year ended May 31st amounted to $169,167 and more than trebled that of the corresponding period a year ago when a net profit of only $51,723 was shown. Current assets amount to $449,990 as against $34,421, thereby leaving the company with net working assets of $415,569.

While the official statement showing the condition of the mine at the end of May shows 1,600 feet of drifting on No. 2 vein at the 600 ft. level and with 1,200 feet in good ore, yet it became known today that subsequent operations have extended this work to about 2,000 feet, with an even larger percentage of the drift in good ore.

The Lake Shore will pay a regular quarterly dividend of 2 p.c. on August 15th.

Goldale

The outlook on the Goldale property is gradually improving as work proceeds. The approximate point at which contact will be found between the basalt and intruding porphyry formation has been established.

The important discovery has been made that gold values are distributed through the schist in a way similar to the McIntyre Porcupine occurrence, although the extent and the consistency of this mineralization remains to be ascertained. These claims were explored in the early days of Porcupine, most effort being directed toward opening up quartz veins. Experience on other successful mines in Porcupine has shown that success or failure hinges upon the extent of mineralization in the schisted areas. It has been found that earlier work on the Goldale was so conducted as to avoid what are now proven to be the more promising sections. Some exceedingly good ore has been found at a depth of 240 feet.

Dome's Rich Ore Shoots

What constitutes good evidence that the Dome Mines will continue to produce gold at a rate of around $4,000,000 a year is to be found in the fact that there are now sixteen points in the mine from which high grade ore may be drawn. Some of the ore is as rich as that found on the Crocker in Munro township and equally as rich as that covered in the Elbow Lake district, which set all Northern Manitoba astir. The Dome management is endeavoring to discourage any tendency to place too great importance on the high-grade shoots and to keep in mind the average gold content distributed through large sections.

Another capital reduction is considered probable with the next regular quarterly dividend. This would ordinarily amount to $1 per share and would reduce the par value to $8, but it is being mooted in usually well-informed circles that the capital repayment may amount to $2 per share.

Nipissing in Kirkland Lake

The Nipissing Mining Company has secured an option on a mining claim situated on the west end of Gull Lake in the township of Lebel, adjoining the Kirkland Lake Proprietary. The claim was originally one of the Burnside group but was not included in the Burnside Company. The Nipissing will explore the property with a diamond drill.

New Find South of Tashota

According to Capt. J. Reddington, who has just returned from the Kowkash Mining Division, a discovery of gold has been made by prospectors who are engaged in carrying on exploration work in the forest reserve at a point about 12 miles south from Tashota. The gold occurs in a vein lying in greenstone formation in close proximity to a quartz porphyry intrusion.

Teck-Hughes July Production

During the month of July the Teck-Hughes mine produced more gold than during any previous month so far in its history, eclipsing any previous month in point of value recovered from each ton of ore treated.

It will be a few days before the complete official figures will be known, but it is already evident that the Teck Hughes made a close bid with the Wright Hargreaves for the position of being the largest producer in the Kirkland Lake district, each mine having produced between $75,000 and $80,000 for the period.

Favorable developments during July at the 730 ft. level caused the mill heads to rise to new high levels and resulted in a recovery of upwards of $25 per ton. It is evident from this that the achievement for the 31 day period placed the mine as the highest grade gold producer in Canada.

New Strike at Elk Lake

A rich silver strike has been made in Tisdale township on properties owned by local prospectors among whom are Fred and L. Quesnel and P. Desrosiers. The discovery was made some time ago but was not made known until negotiations for sale of the property were actually under way. Your correspondent has just been advised by Fred Quesnel that a deal has been closed, the names of the purchasers and the terms of the deal being withheld for the time being.

Queen Lebel Under Option

A. D. Miles, formerly of the International Nickel Company, has made an examination of the Queen Lebel Gold Mines and is considering the question of taking over the property on behalf of investors in England. The property lies to the east of the Burnside mine of the Kirkland Lake Proprietary and is regarded as being one of the more promising of the new properties in the development stage in this district. Prospect work to a depth of sixty feet has shown consistent gold values extending over one of the strongest veins in the district. The mine is now under option to Mr. Miles.

Gold Produced During July

During the month of July the gold mines of Northern Ontario produced approximately $1,755,000, according to preliminary estimates just made. This achievement sets a new high record so far in the history of gold mining in this province. It shows an increase of $10,000 over the June production.

The order of their production for July was: Hollinger, Dome, McIntyre, Porcupine, Wright Hargreaves, Teck Hughes, Lake Shore, Kirkland Lake and Kirkland Lake Proprietary, the first three being in the Porcupine field and the remaining five in the Kirkland Lake district.

With the exception of the Kirkland Lake and the Kirkland Lake Proprietary, all mills were operated at full capacity and handled an aggregate of approximately 175,000 tons of ore.

A reorganization of the Porcupine Crown is under way and holds out promise of renewed production, while the new financing now going on would encourage the belief that the Porcupine V. N. T. will be among the producers of the coming year.

While such substantial progress is being made at the established gold mines of Ontario, it is also true that there is a constantly rising wave of interest in new properties. British and American capital is available in substantial volume, in addition to increased amounts of Canadian capital. The net profit being realized from producing mines now amounts to over forty per cent. New properties, therefore, in these fields, are in demand and interest is spreading far and wide, embracing not only Porcupine and Kirkland Lake, but extending through Lightning River, Fort Matachewan, West Shiningtree, Larder Lake, Gondreau and Munro township gold areas.

South Lorrain

The Mining Corporation continues to meet with favorable results on its properties in South Lorrain. Four veins have been found to carry good ore-shoots and the indications are that the venture will be a profitable one. Until recently the development of ore had been confined it three veins and the prospects were favorable for these deposits being mined at a profit. More recent advice is that good ore has also been developed in Wood's vein, this being a continuation of the fracture along which such rich ore is being mined on the adjoining Keeley Silver Mines.

Thesaurus Prospect

Good ore is being developed on the Thesaurus property where drifting operations are being carried on at a depth of 100 feet. The pay-streak is from 14 to 18 inches in width and carries gold in spectacular quantities. In the wall-rock adjacent to the vein, there is also favorable mineralization and the ore over the full width of the drift may be classed as commercial.

The Thesaurus is controlled by James Nelson, a well-known prospector, and lies in the township of Baden a short distance north of Fort Matachewan. The property is equipped with a small steam-driven mining plant and the question of installing heavier mining equipment is now being considered.

Exploration on Oxford-Cobalt

Work is progressing along the vein at the 75-ft. level of the Oxford-Cobalt property, at a point in close proximity to the diabase-Keewatin contact. From a geological point of view this is regarded as being a favorable point at which to carry on exploration, and the work is occupying considerable interest among property owners in that part of the Gillies Limit.

Visitors at Lightning River

Interest is running high in the Lightning River gold area. Interest centres largely on the Lightning River Gold Mines, the property of the Canadian Finance Company, and the claims held by the Mining Corporation of Canada.

A group of investors involved in the Lightning River Gold Mining Company are leaving the railway today at LaReine, according to advice to the Journal representative. The purpose of the visit is to inspect the result of work already accomplished and to learn the extent and importance of new developments in the district. Another group of visitors will follow at an early date.

The following estimate of current gold production has appeared in Britain:—
(In millions of ounces).

Year.	Transvaal.	The Rest of the Empire.	British Empire.	Foreign Countries.	World.	Drop as compared with 1915 (the maximum) output. Transvaal. p. c.	British Empire. p. c.	World. p. c.
1921	8.0	3.1	11.1	4.8	16.0	11	22	29½
Est. 1922	6.4	3.4	9.8	5.1	14.9	30	31½	34½
Est. 1923	—	—	—	—	16.5	—	—	27½

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EDITORIAL

There are many mining enterprises carried on in such a way that the gambling element is almost eliminated; but these bona fide enterprises cannot operate in a fieta where properties have been given a fictitious value, due to stock promotion and manipulation. —*J. C. Gwillim*—1907.

AN OPPORTUNITY

Our quotation today is from an address to the Canadian Mining Institute by the late Professor Gwillim. There have been few men in the mining profession in Canada gifted, as was Professor Gwillim, with an all-round appreciation of the various factors that compose within, and influence from without, the activities of the mining engineer. His measured statement on this occasion is worthy of the closest attention of those who wish to penetrate to the heart of the mining business.

A large part of the news of mining that reaches the Canadian public nowadays through the daily press can be traced to one of two points of origin; it is an account of legitimate prospecting and mining operations, carried on principally by substantial corporations and private companies; or it is an attempt to interest the public in speculative ventures with a view to obtaining money. Of course, there are all varieties between these two; but the two will account for the bulk of the news items relating to mining.

The Canadian mining industry needs all the money it can get for its development just at present. A considerable fraction of the profits won from our mines is now being re-invested in the attempt to find and prove new mines. Constantly we hear of prospects optioned to one or other of the established mining companies, or to a group of successful mining investors, and occasionally we hear of the favourable result of such a venture. Fortunately such re-investment is becoming more and more the vogue. As the transaction is from start to finish in the hands of men conversant with the mining business, such investment is bound to be well-directed and economical on the whole. But the amount of capital thus available for the expansion of our mining industry is insufficient for the growth we hope and intend, it will have during the next few decades.

There is a very large amount of capital available from the public for mining development, provided the public can be assured of protection against fraud and manipulation. The amount available can be gauged roughly by the huge sums now transferred annually in the name of the mining industry. Though the "gambling" element can be eliminated from mining as completely as it can from almost any other business, still there is spice enough left in a mining venture to constitute a universal appeal. The "gambling" element in legitimate mining has been much exaggerated in the popular mind; but there is actually sufficient of it to offer an unusual attraction to the average investor.

How can we of the mining fraternity make this attractive feature accrue to the benefit of the industry and of our profession? Certainly not by standing by and smiling, in our superior wisdom, at the "lambs that are shorn," or at the "suckers that bite." We need not adopt a humanitarian point of view to see that our present complaisance is not only illogical but tends to our own destruction. Every dollar that is diverted from legitimate mining enterprise into the pocket of a fakir, is a dollar lost to the industry. The case is worse than that; for, "once bit, twice shy," the investor will not heed the call of a genuine promoter when he asks for co-operation. The old established professions have succeeded in clearing their ranks of fakirs; the quack doctor is now a rarity, and "shyster" lawyers are few and far between. The mining profession is in need of similar self regulation.

In justice to our profession, it must be made plain that our mine operators are now characteristically well trained, honest and competent men. It is another necessary part of the industry that needs attention urgently. "Mine promoter" is now a term almost on a par with the famous "mining expert," when this latter is interpreted as the superlative of "liar." To say today that a man is a mine promoter, is to place him very low in the scale of popular estimation. Yet the mine promoter is even more necessary to the industry than the mining engineer, for he is the natural and necessary medium between the prospector, who has an undeveloped "find," and the man with money to spend in opening up the prospect. Without him there would be few new mines developed.

Here we have clearly a case for organized effort. It will be useless to try to repress the activities of the present-day notorious "mine promoter" of the baser sort unless we provide an honest and reliable means of mine promotion. Here lies an opportunity for constructive effort that will furnish a rich reward to the man who devises the means for bringing the pioneer of the mining industry and the investor into harmonious and effective co-operation.

A PROMISE OF FUEL

The air seems clearer over the continent's coal fields, as we go to press. Both parties to the dispute, in both Canada and the United States, seem suddenly to have become aware of the gravity of the situation their difference has created. A compromise has been effected between the leaders on both sides, concessions being made chiefly by the operators. We (the unoffending public) may not have to chop down our shade trees for fuel next winter, after all.

The agreement reached in Nova Scotia, as well as in the United States, is in effect a reversion to the wages prevalent before the present period of acute dissension. The operators agree to a short term at the former high rate of wages, evidently in view of the greater evil that would befall both them and the whole population were a strike to endure throughout the winter. The miners have won the first round in the fight.

There is an obvious unity of action among both miners and operators that pays little heed to the international boundary. Last week this was seen particularly among the miners; now it is the operators of both Pennsylvania and Nova Scotia that have decided to yield, as gracefully as may be, to the pressure of necessity.

In the meantime we have in Nova Scotia an example of the danger of playing with fire. The refusal of the miners to disregard the well-arranged strike preparations in favour of the eleventh-hour agreement sanctioned by their leaders, is only the natural and inevitable result of the inflammatory disposition that has been assiduously cultivated among them for some time past. The extremist leaders have kindled and fanned a flame that is now, temporarily at least, beyond their control. Incendiary speech is not punishable by law, as is literal incendiarism; but it is equally as dangerous to well-ordered society. The firebrand of speech is morally just as culpable as he who fires a building, and is usually more of a coward since he is not subject to the rigours of the national law.

It is certain that coal miners, like all others in this weary old world since the Fall in Eden, will have to work for a living. It is just as sure that since competition in various guises is at present the guiding principle in the world's business, coal miners will have to fight, both hard and continuously, for their rightful share of the profits of their labour. When they do this fairly and squarely, in a spirit of justice to their employers and the community as well as to themselves, they will deserve and will obtain the hearty support of the public. We hope that the spirit of justice and fair play, observed by every honest man even in the midst of the bitterest fighting, will soon permeate their councils and inspire their leaders. We do not wish to see in Nova Scotia a reversion to the guiding principles of the Goths and Huns; we want the clean, British ideal.

THRIFTY CANADIANS

There is a belief current throughout Canada that we have now attained the state of nationhood. Canada's experience in the Great War is judged (in the main, correctly) to be to our country what the twenty-first birthday is to a young man. But like the young man, Canada has a long way to go, and a hard way at that, before we can pride ourselves on having attained the essential attributes of nationhood.

As with a young man, so with a young nation, earning power and financial solvency are the touch-stones of material well-being. In our case, no one will question Canada's ability to produce wealth beyond the average even of young countries; nor does our country's financial status alarm the well-informed, even though it may press hard upon those in authority upon whom devolves the duty of paying Canada's bills. It is the present wide-spread spendthrift habit of Canadians that is a matter of grave concern to those who take time to consider seriously the national well-being.

Nature has been so bountiful to us that the average Canadian earns a competence with comparative ease. True, we are a nation of workers, and our average production is high. But the Canadian does not have to struggle for a livelihood as does a German, a Frenchman or a Japanese. This is a fortunate circumstance that will stand us in good stead for generations to come, if we use the privilege rather than abuse it.

At present the average Canadian is inclined to waste the treasure that nature provides. It is a case of "easy come—easy go." We have still to learn the lesson that has taught every peasant in France the value of a bank-account, and that made Britain the world's creditor. Only the merest fraction of Canadians have yet learned to save and to invest. Until the lesson of thrift has been well ground into us, we will continue to be on a par with the reckless youth whose new-found freedom from parental authority results in an orgy of expenditure—with its inevitable results.

Canada is fortunate in having at present a Minister of Finance who is fully aware of our besetting sin (in the financial way), and who is determined to exert every means within his power to help his countrymen to overcome it. Mr. Fielding's announcement that the Victory Bonds issued in 1917, which mature December 1st of this year, can be converted on favourable terms into another issue of Dominion bonds, is an inducement to a host of small investors to carry on the good habit they inaugurated five years ago. The elimination of the tax-free concession will make the new loan less attractive to large investors, and that is not to be regretted.

We hope, and believe, that the growing spirit of nationalism will be sufficient at this time to induce a general response to the test now provided by our veteran Minister of Finance. We must learn to be thrifty, for our own sakes as well as for the sake of our country.

A MYTH RE-EXPLODED

During the past quarter-century there have been numerous attempts to use the veins of anthraxolite that were discovered in the Sudbury district in the nineties. It is highly significant that these attempts give evidence of very little work on the veins themselves, compared with the effort made to pry loose from the investing public some of its hard-earned cash. In fact, a comparison of work accomplished in the field with the volume of propaganda based upon it makes it obvious to the initiate that here has been one of the numerous attempts to exploit the public on the basis of a fancied natural resource. Anthraxolite has been of use to the stock jobber, not to the miner.

We publish today the full text of an official statement issued from the Department of Mines, Toronto. In view of the present attempt to raise money on the strength of the alleged coal beds, the Department has evidently deemed it wise to make assurance doubly sure by having the deposits and the locality examined once more, by both a geologist and an engineer. Mr. C. W. Knight, Assistant Provincial Geologist, and Mr. James Bartlett, Inspector of Mines, have reaffirmed Dr. Coleman's conclusion of twenty-six years ago, and demonstrate once more the fact that by no conceivable means can the anthraxolite veins of the Sudbury district yield any but an insignificant amount of fuel, and poor fuel at that.

We have before us a written statement designed to convince investors that there is a possibility of finding coal beds in the rocks near Sudbury. It is a hodge-podge of fact and misstatement and was circulated quite widely in the daily press a few months ago in the form of interviews and news "stories." A few excerpts will serve to show its style.

The absence of fossils in the rocks of the Sudbury series has been questioned in this way: "Fossils have been found "by myself and my assistant, also by three independent "gentlemen who examined the district." Mr. Knight discovers that these fossils were found in a gravel bed. Enough said!

Farther on, we read that "I have indisputable proof "from the ground that the carbon in the shales at point "of contact with the earth is due to coal beneath. I have "in my possession a sample which clearly shows the coal "in contact with the shale, and the saturation of carbon "direct into the shale." This is pseudo-scientific rubbish and, like most of the rest of the statements made, mere quibbling. The writer wishes to convey the impression that he believes in the presence of beds of coal, but he makes his statement ambiguous so that it may not be actionable.

The Department of Mines is to be heartily commended in taking this direct and decided action on behalf of the public. If there were a remote possibility that coal might be found in the Sudbury region, exploration would be justified. As there is no such possibility, this official report will make it plain, even to the unsophisticated, that any attempt to raise money in a search for coal there is more than likely to be a downright swindle.

EDITORIAL NOTES

Mr. Rolph's paper, on another page, is one of those pieces of research that, put together in sequence, constitute the basis of most of our technical progress. It is an item in the thorough examination now being made in the mining engineering laboratories of Toronto University with a view to determining the fundamental principles of grinding in a ball mill. Mathematical data such as those recorded by Mr. Rolph are an essential part of such a research, and we publish them here, confident that they will be of service to numerous students of the grinding problem.

It is a significant fact that the Portland Canal district, which was booming fifteen years ago, continues to disclose ore bodies that will make mines. There, as elsewhere throughout Canada, the spaces are so vast that the prospector cannot do more than skim over them in the first rush. Only the obvious outcrops are discoverable by such means, and the fact is that only a small proportion of ore bodies can be found by the means available to the prospector who travels far and fast. Detailed work will continue to disclose, in the Portland Canal district as elsewhere, new ore deposits for many a year to come.

We wish to draw attention to an item on another page, under the caption "The Spectrograph for Metallurgical Work." It is not fully realized by the generality of practical metallurgists that there is now available, in usable form, an apparatus that will dissociate, almost instantly, the ingredients of the most complicated alloy, slag, or other material. It may be that spectrum analysis will become an important aid in metallurgical works, particularly in those where smelting is practiced. If so, its trial and use by practical metallurgists will hasten the day when its further perfection will allow of its fuller use.

TENDERFEET

Twilight was dying into dusk. The moon,
Now risen, gave promise of rich radiance soon
To silver stream and forest and high hill,
Where barren boulders posed as sentinels.
The loon, unseen, poured out his harsh refrain
Harsh, yet harmonious in its dying strain.
A mystic glamour brooded o'er the scene,
All was precisely as it should have been.
Pipes lit, meal done, and flies not too malicious,
But no one volunteered to wash the dishes!

VNON

The Maple Leaf Asbestos Corporation

Among the mills that have commenced operations during the last two years in the Thetford area of the Province of Quebec, is that of the Maple Leaf Asbestos Corporation. This mill is located on Lot 29, Range A of the township of Coleraine, about half way between Thetford Mines and Black Lake, and one mile south-east of the main line of the Quebec Central Railway.

Early Development

The property operated by the Maple Leaf Asbestos Corporation consists of Lots 27, 28 and 29, Range "A", Coleraine. This property was worked in the early days of the industry by the late Dr. James Reed. The workings at that time consisted of five small pits on lot 29, and two on lot 27. The formation in the two groups of pits varies considerably. On lot 27 the asbestos is concentrated in veins of Crude varying in width from $\frac{3}{4}$ in. to 3 in. These veins are separated by masses of completely barren rock. On lot 29, however, this condition does not prevail. Here there are very few areas of barren rock, and whereas the amount of long crude is considerably less than on lot 27, still there is a very good percentage of No. 2 Crude, while most of the rock is a very good grade of mill ore.

When these claims were worked by Dr. Reed, the pits on lot 27 were worked for crude. On lot 29, a small mill was constructed. The motive power was steam. In the spring of 1920, a syndicate was formed for the purpose of operating these claims, the plan being to mill the ore from Lot 29, and to work lot 27 for Crude. The results obtained from the operation of this small mill were so good that it was decided to erect a larger plant. Accordingly, in the fall of 1920, the Maple Leaf Asbestos Corporation was formed to erect a mill of 400 tons daily capacity. The construction of the mill was put through very quickly, the clearing of the ground beginning on November 1st, and operations being under way by March 2nd, 1921. The plant constructed at that time by the Maple Leaf Asbestos Corporation is the same that is in operation to-day. Certain changes have been made in the flow-sheet and some additions have been found necessary in the storage of asbestos; but the mill is essentially the same as when it was erected.

Plant

When it was decided to go ahead with the new mill, an effort was made:

1. To keep the investment as low as possible.
2. To balance the production of rock from the pit with the capacity for milling material.
3. To secure ample dump space for tailings.
4. To provide for ease of handling material from the pit to the mill.

Though it may be said that these objects are almost invariably sought for in the construction of a new plant, it must be pointed out that the Maple Leaf Asbestos Corporation adhered to this policy strictly, and attained its end to a marked degree. The necessity for this was accentuated with this company for the reason that the engineering advice obtained by the owners of the enterprise was to the effect that prices were at a very high level, unknown until the war, and that in all probability, unless the plant could be so designed as to work under conditions of normal prices, it would prove a failure.

Crushers, Mill and Dump — Maple Leaf Asbestos Corporation

The method of mining was gone into very carefully, and though it appeared that a cable derrick is not very economical for a long haul and a deep pit, it is extremely economical for a short haul and a shallow pit. It is largely for this reason that cable derricks were installed, since the pits are comparatively shallow and within 50 yards of the crusher. As the pits become deeper, the company expects to change this form of haulage to the crusher. For the method of mining, the open pit was decided upon as being by far the most economical.

Flow Sheet

Rock from the pit is loaded into two-ton boxes, which are hoisted by cableways to a chute discharging directly into a 15 in. by 30 in. jaw crusher. Boxes with dry rock are stopped just before reaching the crusher chute and are dumped direct into a four-ton car, which runs out to the rock dump by gravity and is hauled back empty by an air hoist. It is interesting to note here that 800 tons of rock have been handled in one day by the two cable derricks, each operated by a 50 H. P. motor. But this is exceptional, and the two derricks ordinarily handle daily 350 to 375 tons each. The large tonnage and low horsepower is due partly to the fact that the pits are shallow and near the mill.

From the jaw crusher, the rock discharges into a 30 foot by 50 inch, rotary dryer, which is heated by coke burned in a specially designed fire box, calculated to give a maximum efficiency in drying per pound of fuel burned. From the dryer, the rock discharges into a No. 3 gyratory crusher from which point it is conveyed into a mill bin with arrangement so made that the crusher house may feed direct into the mill or bin, also so that it may feed partly into the bin, and partly into the mill. The crusher house is so designed that, generally speaking, a very uniform flow of rock is obtained, when feeding direct from the pit into the mill. This saves unnecessary hoisting of rock with the elevator. The ore entering the mill goes through a Torrey cyclone, or a hammer crusher, either one machine or the other being used according to the class of fibre it is desired to make. From this point the ground material passes over rock screens and the fibre is lifted off by air suction, the rock continuing to a Laurie cyclone. The discharge from this machine passes over more rock screens, and then follows on to the tailing belt. Grading is accomplished on several sets of grading screens, which are aided in certain instances by dusters.

No attempt is made here to describe the special arrangement of suctions and grading screens, as these are varied in accordance with whether it is desired to produce a fibre with a great deal of "life", as shingle stock, or soft fibre like paper stock. The finished fibre drops into bins at the opposite end of the mill from which the rock enters. These bins are within 15 feet of the bag chute, which discharges by gravity directly into the storage shed. The whole system is extremely compact and calculated carefully to pass a maximum tonnage with the minimum amount of labor.

Characteristics of the Fibre Produced

Of all the fibres produced outside the actual Thetford deposit, the Maple Leaf resembles more closely the Thetford fibre than any other. The "C" fibre is exceptionally white; paper stock is uniform and white; the "X" Fibre is tough, and at the same time not harsh; while the crude, when carded, compares exactly with carded Thetford crude. This is curious for the reason that other mines lying only a short distance nearer to Black Lake than the Maple Leaf show distinctly the characteristics of the harsher Black Lake fibres, which does not appear at all in the Maple Leaf grades. Also, although the Maple Leaf fibre is a pure white, there is no talc in it, the colour being due entirely to the intrinsic whiteness of the asbestos itself.

The first impression one receives of the plant is the absolute absence of lost motion, the rock going direct from the pit to the crusher, from there direct to the mill, and from that point direct to the sand dump. This naturally keeps the power costs for extra handling down to a minimum, and also allows the plant to be run with the least possible number of operatives. On careful inspection this proves to be the case. Aside from the regular men needed to watch the different machines, the complete number of extra men consists of two carpenters and one helper for general repair work, and one dump cart for stripping. On the night shift there are no extra men. On inspecting this plant carefully, it would seem that it is extremely well operated, considering its size, and should compare more than favorably in the matter of costs with many of the larger plants in the district.

The plant of the British America Nickel Corporation has resumed operations in a small way.

THE SPECTROGRAPH FOR METALLURGICAL WORK

During recent years, developments in the appliances and technique of spectrographic work have been marked, and have now begun to make this branch of qualitative analysis available in a practical way. Messrs. Adam Hilger, Ltd., 75a Camden Road, London, N.W.1., have recently issued a series of catalogues and folders descriptive of the advances in the art of spectrography and its uses, and the appliances they are prepared to furnish. From one of these we gather the following data.

Spectra for the accurate determination, qualitatively, and the approximate estimation, quantitatively, of the ingredients of, say, a complex high-speed steel can now be readily made with spectrum apparatus. Arc spectra obtained through the agency of poles specially prepared to suit varying circumstances are recorded in photographs, and examined at leisure. The actual taking of the photograph can be accomplished by an intelligent assistant, and the chemist himself has now the means of readily interpreting the lines recorded on the spectrogram.

"To the analyst, the complete qualitative analysis of an unknown alloy, revealed by a spectrogram, is a sure basis for the planning of the most direct and rapid method of attack. As the determination of each element proceeds, the purity of precipitates may be checked as often as desired. The spectrograph proves invaluable in the recognition of impurities, the separation of which would involve a lengthy and difficult procedure, or when the weight of an unknown is less than is necessary to complete the desired determinations. A few hundredths of a gram will usually suffice for spectrographic analysis.

"Impurities in raw material are often a source of annoyance, especially when their detection involves delay and costly analytical work. Whether low conductivity in copper is due to arsenic, nickel, or something else, may be quickly found out. Residual traces of boron, magnesium, manganese, silicon, vanadium and other deoxidising agents are easily identified where wet analysis may fail to reveal their presence, even after days of effort. Complex alloys of any kind are dissociated by the spectrograph into a spectrum, the reading of which gives the elements present, together with an idea of the relative amounts of each. The secrets of the inventors of alloys and hardened metals are no great problems when, for their solution, one can depend on the application of the microscope and the spectrograph."

This gives a suggestion of the rapidly expanding field in commercial as well as research work now open to spectrum analysis. The spectrum bids fair to become to the analyst what the X ray is now to the surgeon and dentist. The progress of the spectrograph must be followed closely by those analysts and metallurgists that wish to keep abreast of the times.

The nineteenth week of the strike in the United States, Aug. 7-12, opened with a decided increase in production. Returns so far received indicate an output of soft coal of about 1,800,000 net tons, or 500,000 tons more than the week before. The increase is due to gradual improvement in traffic conditions on the railroads serving non-union fields and also, but only in a very small way, to increased production in fields hitherto throttled by the strike. Despite this increase in bituminous coal output the nineteenth week finds production still about 550,000 tons below the level reached before the shopmen's strike.

Kick vs. Rittinger

AN INVESTIGATION OF THE LAWS GOVERNING CRUSHING IN BALL MILLS

BY E. A. ROLPH

In these days of reconstruction and desired expansion of operations in the mining world, the mill man is vitally interested in the question of capacity and efficiency. As a high percentage of milling costs is charged against crushing, it would appear to be of the utmost importance to be able to analyse crushing operations and calculate efficiencies. It is a well known fact that many of the improvements that have developed in the design and operation of mechanical engines, such as steam, electrical and oil, have been due to the ability of the engineer to measure the efficiency of each particular piece of apparatus. To explain the action of crushing, and as a means of interpretation of efficiencies, two laws have been put forth, commonly known as those of Kick and Rittinger. It is not the intention of the writer to attempt in this paper to prove or to disprove either one of these so-called laws of crushing; but rather to collect them in a form that can be quickly grasped and easily applied, as well as to give a brief description of the principles underlying each.

Kick's Law

Kick's law,* as enunciated by Stadler, who was its chief exponent, is as follows: —

"The energy required to produce analogous changes of configuration of geometrically similar bodies of equal technological state varies as the volumes or weights of these bodies."

Fig. 1 is a diagramatical representation of cubes under a crushing force to illustrate Kick's Law through the proportion of sides, work and energy on each cube.

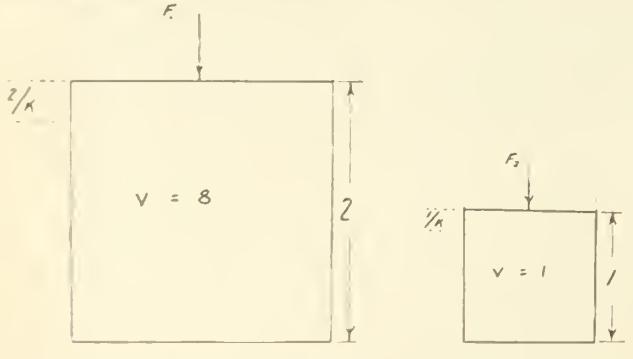


Fig. 1

Example of Proportions

Diameters, S, are in proportion of 2 : 1

Forces F_1 & F_2 are in proportion of 4 : 1, from $2^2 : 1^2$

Work done is in proportion of $4 \times \frac{2}{K} : 1 \times \frac{1}{K} = 8 : 1$,

or as the volume.

This law seems to be based on three laws of mechanics which are now universally known and accepted. **Briefly stated, they are as follows: —

1. Within the elastic limit, the force required to produce a certain deformation is directly proportional to the area of the tranverse section.

2. The amount of deformation within the elastic limit is directly proportional to length of specimen and to force applied.

3. Work done in producing a given deformation is the product of the average force by the distance through which it acts.

These laws are certainly true in cases where change of configuration is within the elastic limit, and energy absorbed is proportional to volume. Supporters of this law claim that for perfectly elastic bodies it remains true until rupture occurs, and as they say rock is very nearly a perfectly elastic substance, the law still holds good and is a very close approximation to the truth.

The difficulty and difference arises in our not understanding just what does occur at the elastic limit. Without a doubt energy is proportional to volume up to this point. In opposition to this it has been stated * that at the point of rupture, the energy stored in the particle is released and aids in further deformation without further increase in energy absorbed.

A short mathematical expression of the above laws might prove of interest at this point.**

If W = work
c = maximum unit stress within elastic limit
f = deformation
l = length of body
A = area of transverse section
S = any unit stress within the elastic limit of the substance
P = Units of force
D = edge of unit cube
E = modulus of elasticity

Then, within the elastic limit:

$$f = \frac{PL}{AE}$$

$$W = \frac{Pf}{2} = \frac{P^2L}{2AE} \qquad S = \frac{P}{A}$$

$$W = \frac{A^2S^2L}{2AE} = \frac{S^2 \times AL}{2E}$$

If we assume the particle under load to be a cube of edge D, then $A = D^2$; $L = D$; $\frac{S^2}{E}$ is a constant.

Therefore $W = \frac{S^2 \times D^3}{2E}$ or is proportional to volume.

The above is a brief description of the basis of all arguments in favour of this law.

Application of Kick's Law.

In any regular series of sized particles, the volumes or weights of the particles decrease from grade to grade in the same ratio as the number of particles in a unit volume increases. In other words, the point is that volumes decrease as number increases. Then the product of the volume and the number of particles of that grade is a constant, for each and every grade in the scale. According to Kick the energy absorbed is proportional to the volume of the body

* Eng. & M. Journal, Vol. 98, p. 995 & 945.
A. I. M. E. Vol. XLVIII.
M. E. Vol. XLVIII p. 153.

*A. O. Gates — Discussion on Taggart's Paper. Trans. A. I. M. E. Vol. XLVIII. (2) See Taggart's Paper.
** See Taggart's Paper.

crushed, therefore it follows that the energy required for reducing the unit weight is constant for each grade. That is, it requires the same energy to crush from one inch cubes to half inch cubes, as from half inch. to one-quarter inch. Since this is the case, the ordinal numbers of any aritmetical progression given to these grades, represent the relative values of energy which has been spent on the unit mass to bring it to that grade. For example if to crush a unit weight of 1in. cubes to $\frac{1}{2}$in. cubes requires 1 energy unit, and to crush from $\frac{1}{2}$in. to $\frac{1}{4}$in. requires 1 unit, then to crush from 1in. cubes to $\frac{1}{4}$in. requires 1 plus 1, or 2 units, which would be the relative value for that grade. Similarly 3 would be required for $\frac{1}{8}$in. cubes, etc.

The arithmetical mean of the ordinal numbers of the two screens determining a grade represent, in accordance with Kick's Law, the energy absorbed in making that grade from the initial unit mass.

These ordinal numbers are also known as Energy Units and are the multipliers by which the percentages of each grade must be multiplied to give the energy value of that grade. The sum of these products represents the number of energy units or the ordinal number of the whole sample. If an analysis is made of the feed and discharge of any crushing device, and the energy units calculated, the difference between the two represents the work done per unit in the machine. In order to obtain total work done, multiply work per unit by the tonnage dealt with.

The relative mechanical efficiency =

$$\frac{\text{Tonnage} \times \text{Work per Unit in Energy Units}}{\text{The Horsepower}}$$

Since most industrial plants and practically all laboratories use the Tyler Standard Screen Scale, this table of E. U. for Tyler grades is given thus by Taggart: —

Aperture	Mesh	Ordinal No. or E.U.
1.050 In	1.05	0
0.742	0.742	1
0.525	0.525	2
0.371	0.371	3
0.263	3	4
0.185	4	5
0.131	6	6
0.093	8	7
0.065	10	8
0.046	14	9
0.0328	20	10
0.0232	28	11
0.0164	35	12
0.0116	48	13
0.0082	65	14
0.0058	100	15
0.0041	150	16
0.0029	200	17
0.0014 (assumed)	-200	19

In this case he assumes the average size of the -200 mesh particle to be 0.0014in. and assigns it a value of 19. Most writers prfer to use 20 or even higher as being fairer than 19. There is some question as to what the correct size of this material should be. However, any reasonable size and corresponding value adopted should be as fair to one case as to another.

Example of Calculation of Relative Effuciency in Kick's Energy Units

Case 1	Case 2
Mill — 1ft. dia., 18in. long	1ft. × 18in.
Load — .3to 1in & $\frac{3}{4}$in Balls	.6 ditto
Feed — 400 gms. per min. = .634 tons per 24 hrs	400 gms. per min = .634 ton per 24 hrs.
H. P. — .2105	.3179

Case 1 and Case 2 will now be compared as to efficiencies:

CASE 2.

Mesh	E. U	Feed%	E.U. Feed	Disch.%	E.U	Disch
14	9	29.2	263.0	0.0		
20	10	50.2	502.0	0.2	2.0	
28	11	20.4	224.4	0.9	9.9	
35	12	0.2	2.4	3.0	36.0	
48	13			7.3	94.6	
65	14			12.4	174.0	
100	15			20.2	303.0	
170	16.5			16.6	274.0	
-170	20			39.4	788.0	
Totals			991.8		1681.5	
Units of Work Done			1681.5 —	991.8	= 689.7	

CASE 2

Mesh	E.U.	Feed%	E.U.Feed	Disch.%	E.U	Disch
14	9	29.2	263.0			
20	10	50.2	502.0	0.9	9.0	
28	11	20.4	224.4	2.8	30.8	
35	12	0.2	2.4	3.8	45.5	
48	13			5.9	75.6	
65	14			7.7	107.8	
100	15			14.8	222.0	
170	16.5			15.9	262.0	
-170	20			48.0	960.0	
Totals			991.8		1712.7	
Units of Work Done			1712.7 —	991.8	=	720.9

Therefore Case 2 has the greater capacity, or more work has been done. Now, let us examine the relative mechanical efficiency, since feed or tonnage is the same in both cases.

$$\text{Case 1 Effic.} = \frac{689.7 \times .634}{.2105} = 2070$$

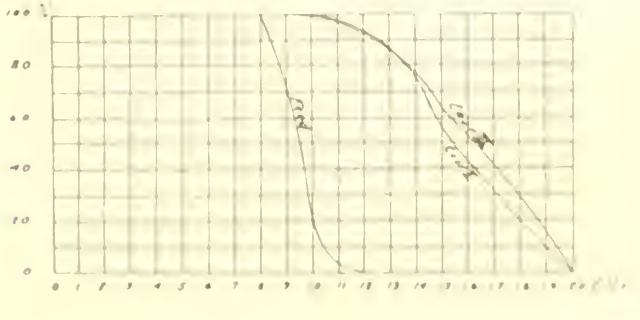
$$\text{Case 2 Effic.} = \frac{720.9 \times .634}{.3179} = 1439$$

Dividing by 100 to bring these figures to the usual expressions, the relative efficiencies are as 20.7 is to 14.4, or Case 1 is 43.7% more efficient than Case 2.

Graphical Representation of Kick's Law

The results of the application of Kick's Law for comparison can be plotted on squared paper. If mesh or ordinal numbrs are plotted equidistantly along the horizontal scale, they will represent energy according to this law. On the vertical scale are plotted weights in percentage through the screen. The space between equally spaced horizontal lins represents equal volumes or weights. The area between the curve of original material and zero coordinates represents the energy already spent upon it and the area between curves of feed and discharge represent energy absorbed in the machine according to this law.

One square on the diagram is equal to 1 × 10 E U's; so by counting the squares to the left of any curve, the total energy per unit for that sample may be computed readily, and effiency calculated as before. Comparison of curves of Case 1 and 2 shows the increase of work in Case 2 over that of Case 1



Rittinger's Law

"Work done in crushing is proportional to new surface exposed by the operation".

Figure 2 is a diagrammatical representation of cubes under force to illustrate Rittinger's Law, through the ratio of areas of section, forces, and dislocation of offset faces.

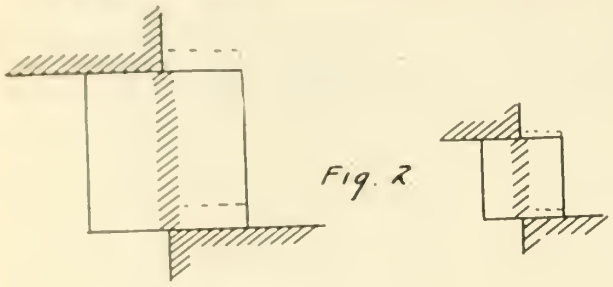


Fig. 2

Example of Proportions

$$\text{Area of Section A} : \frac{A}{4}$$

$$\text{Shearing Force F} : \frac{F}{4}$$

$$\text{Dislocation of offset faces D} : D$$

$$\text{Energy FAD} : \frac{FA}{4D}$$

1 : 4 or as the surfaces.

Gates *explains the application of the law to above figures as follows; —

Suppose forces were applied on the two offset faces until the deformation shown by the dotted lines was secured; then only the molecules along the centre vertical line will be stressed and deformed. The mass away from this line or surface will receive no pressure or deformation. In this case the assumption is that the material is perfectly rigid and inelastic. The force would then act in the fracture plane itself and the distance which the external force would have to overcome to do work would have vanished.

Rittinger stated that increase of surface is directly proportional to the force required for reducing, "and, therefore, also to work absorbed in effecting the separation". Now work is defined as the force times the distance through which it acts. Therefore if work is proportional to force, the distance factor must be ignored altogether or else taken for a constant.

This criticism of the theory is a very active one, and at the present time has not been proved one way or the other, although evidence has been offered to explain that the distance is very nearly a constant for any material.

The practical part of the application of this theory is in determining a means of measurement and designation of the surface in any particular grade of unit weight.

This relationship can be shown by an application of the laws of mechanics discussed under Kick's Law:

$$\text{We have } W = \frac{P\,f}{2} = \frac{P^2 L}{2AE} \quad \text{since } f = \frac{P\,L}{A\,E}$$

Now, if P and E are constant,

$$W = \frac{K\,L}{A} \quad \text{where } K = \frac{P^2}{2E}$$

or for a cube of diameter D,

$$W = \frac{K\,D}{D^2} = \frac{K}{D}$$, or is proportional to the reciprocal of the diameter.

Since this relationship exists, for given weights of rock the total surface of all the particles in each grade varies inversely with the diameter. Therefore the total relative surfaces exposed by each grade are obtained by dividing the weight by the average diameter of particle in that grade. Then the relative work done is found in the same manner, dividing the weight by the average size of diameter of that grade. It will then be necessary only to multiply the reciprocal of the diameter by the percentage in each grade to determine the amount of work completed. Then, knowing the amount already done befor entering the machine and that done on its discharge, we have the amount done in the machine by substraction.

To find the relative efficiency, multiply this figure by the tonnage fed, and divide by the horse-power.

Table of Reciprocals of Diameters for Tyler Standard Screen Scale

Production	Mesh	Diam. Av. Size Particle	Reciprocal
1.050		1.268	.788
0.742		.896	1.115
0.525		.6335	1.582
0.371		.4480	2.23
0.263	3	.3170	3.15
0.185	4	.2240	4.46
0.131	6	.1580	6.34
0.093	8	.1120	8.92
0.065	10	.0790	12.65
0.046	14	.0560	17.85
0.0328	20	.0395	25.1
0.0232	28	.0280	35.8
0.0164	35	.0198	50.5
0.0116	48	.0140	71.5
0.0082	65	.0099	101.0
0.0058	100	.0070	142.8
0.0041	150	.0049	204.2
0.0029	200	.0035	286.0
	— 200	.0014	715.0

The correct reciprocal to use for the -200 mesh is a much debated question. Bell* used 780 in his calculation. The concensus of opinion appears to indicate that a somewhat higher value should be used. However, for practical purposes 715 seems a fair value to use. The examples used are the same cases worked out previously according to Kick's Law. The Letters R. S. U. are used as an abbreviation for Rittinger surface Units.

CASE 1.

Mesh	Recip.	Feed p.c.	R.S.U. Feed	Disch. p.c.	Disch.
On 10	12.65				
14	17.85	29.2	521	0.0	
20	25.1	50.2	1260	0.2	5.02
28	35.8	20.4	730	0.9	32.2
35	50.5	0.2	10	3.0	151.5
48	71.5			7.3	518.0
65	101.0			12.4	1250.0
100	142.8			20.2	2880.0
170	238.0			16.6	3950.0
— 170	715.0			39.4	28200.0
Totals			2251		36986.7

Work done per unit = 36986 — 2521 = 34465 R.S.U.

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§ A.O. Gates E. & M. J., Vol. 97, p. 795; Vol. 95, p. 1033.

*An investigation of Rock Crushing made at McGill University.

John W. Bell, Trans. C. M. I., Vol. 19.

CASE 2.

Mesh	Recip.	Feed p.c.	R.S.U. Feed	Disch. p.c.	Disch.
10	12.65			0.0	
14	17.85	29.2	521	0.0	
20	25.1	50.2	1260	0.9	23.0
28	35.8	20.4	730	2.8	100.0
35	50.5	0.2	10	3.8	192.0
48	71.5			5.9	422.0
65	101.0			7.7	778.0
100	142.8			14.8	2110.0
170	238.0			15.9	3790.0
-170	715.0			48.0	34300.0
Totals			2521		41715.0

Work done per unit = 41715 — 2521 = 39194 R.S.U.

Indicating that Case 2 has the greater capacity.

Relative Mechanical Efficiency

$$\text{Case 1, Efficiency} = \frac{34465 \times .634}{.2105} = 103{,}700$$

$$\text{Case 2, Efficiency} = \frac{39194 \times .634}{.3179} = 78{,}200$$

Relative efficiencies are as 10.4 : 7.8, or Case 1 is 33.4% more efficient than Case 2.

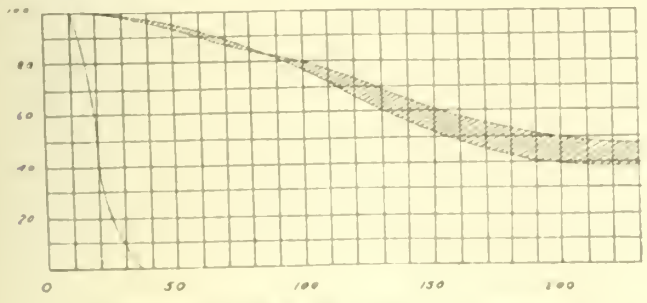
By Kick, Case 1 is 43.7% more efficient.

By Rittinger, Case 1 is 33.4% more efficient.

Graphical Representation of Rittinger

"Energy is proportional to new surface formed in the operation."

It has been shown that the relative work done is found from the product of weight and reciprocal of average size of particle according to this law. This product can be shown by an area, which forms the basis for the crushing surface diagram.



On the vertical scale are plotted weights per cent., so that the material between any two equally spaced horizontal lines has equal weight or volume.

On the horizontal scale are plotted reciprocals of diameters, so that the distances measure the differences in reciprocals between two points on the same screen analysis curve. These points are called "theoretical mesh" by Gates.

The area between the curve of the original material and the zero coordinates represents the energy absorbed in reducing the material to its present state. The area between this curve and the discharge curve is proportional to the energy absorbed in crushing in the machine. This area is then also proportional to the actual surface produced. Applying proper constants, the actual surface can be measured.

To measure the surface, a new unit was devised by Gates, which he called a "mesh gram". This unit quantity is defined as the surface produced when one gram of particles of the same size or diameter is reduced to a diameter whose reciprocal is one greater than before reduction. Similar terms as mesh tons, mesh pounds and mesh per cent. can also be used.

From the definition of a mesh gram, it is weight times difference of reciprocals, or weight divided by diameter, which is a measure of surface, so that a mesh gram is a measure of surface.

From the chart it is evident what a large part of the area extends to the right of the diagram or in the -170 mesh product.

The hatched portion shows the increase of work in Case 1 over that of Case 2.

The portion of the diagram to the left of the feed curve represents energy already spent to bring it to that condition.

One square on the diagram is equal to 10 × 10 or 100 surface units.

Conclusion

This paper has been an attempt to set forth the essential differences in the theories of Kick and Rittinger, as well as the application of each to concrete examples for the calculation of efficiencies.

Although the theory of Kick might appear the more logical, experimental work has served to show that Kick's theory is not applicable, while that of Rittinger conforms with the results of experiments.

Toronto University, July 1922.

ELECTRO-CASTINGS, LIMITED

The electric steel plant at Collingwood, Ontario, operated during the war by Wm. Kennedy and Sons and later acquired by the Baldwin Canadian Steel Corporation, has been taken over by Mr. William T. Stevens, who has organized Electro-Castings, Limited, for the production of grinding balls, liner plates, castings for pistons and piston-rings and other such material.

At present a force of twenty men are engaged in operating and re-modelling the plant. The pay roll eventually will include fifty men. In addition to the present plant, new electric furnace equipment with a large daily capacity will be installed. In the meantime a two ton Heroult electric furnace is being operated.

The site of the plant is a fine one of six acres. The foundry is 170 ft., by 162 ft., and the main building 210 ft., by 100 ft. The premises also include offices, carpenter shop, storehouses and an electric sub station.

ADVANCE SUMMARY OF COAL STATISTICS

The Mining Branch of the Dominion Bureau of Statistics has issued an advance summary of coal statistics for Canada showing the imports of anthracite and bituminous coal by grades and by provinces during the first seven months of the present calendar year with comparative figures showing the average imports during the same period in the three years 1919-20-21. Exports of Canadian coal are also shown.

Table 1. Imports of Anthracite Coal by Grades and by Provinces

Province	Total for Yr. [illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Nova Scotia	8,926	29,781	31		28
Prince Edward Island	232	1,001			6
New Brunswick	23,077	36,876			68
Quebec	216,516	681,612	191	36,134	36
Ontario Central	790,898	1,692,263	19,510	20,140	17
Head of Lakes		111,8[illegible]			
Manitoba	5,716	1,491	2,328	132	138
Saskatchewan	80	20			100
Alberta					
British Columbia	21	109			
Yukon					
Total	1,045,515	2,560,8[illegible]	19,10[illegible]	[illegible]	1

(Continued on Page 559)

The Alleged Coal Beds At Sudbury

The following official statement has been issued by Mr. J. W. Gibson, Deputy Minister of Mines, Toronto. It should dispose effectively of the campaign that has been conducted for some time past to interest investors in a wild goose chase after coal.—Ed.

It is confidently asserted that anthracite exists near Sudbury and suggestions are being made to the Department of Mines that the deposits should be investigated with a view to opening up a possible supply of coal, which would undoubtedly be a boon to the public at the present time.

The existence of coaly material in the locality mentioned has long been known. In 1896 one, C.H. Collings, reported to the Bureau of Mines that he had found in the township of Balfour a seam of smokeless coal, and in view of the great importance of such a find, if authenticated, the Bureau instructed Dr. A. P. Coleman, then Professor of Geology in the University of Toronto, to visit the locality and investigate the occurrence. A Government diamond drill was also dispatched to the spot to make the requisite borings. Dr. Coleman duly examined and reported and in view of the wide-spread interest the public took in the matter his report was published by the Bureau in a special bulletin under date of November 7th, 1896. The matter was also included in a somewhat different form, but to a like effect in the Sixth Annual Report of the Bureau (1896, pages 151-169). In addition, a thorough examination of the material itself and a number of analyses were made by the late Dr. W. H. Ellis, then Professor of Applied Chemistry at the School of Practical Science, and Dr. Ellis' report follows that of Dr. Coleman's in the same volume (pages 162-166). Dr. Coleman is an acknowledged authority on geology, with a Continental reputation, and Dr. Ellis' ability and standing as a chemist and analyst was perhaps unrivalled in Canada.

Dr. Coleman's Report in 1896

Dr. Coleman states that "the coaly material occurs as an irregular vein in black fissile slate mapped by Dr. Bell as Cambrian. The vein runs about north and south up a somewhat steep rocky hill, turns a little to the east on the hill top and pinches out. Toward the south the lower end of the vein is buried under the boulder clay which covers the valley. The length of the vein exposed is about 70 feet, but further excavation may show that it continues south beneath the boulder clay. In width the coaly matter measures at its widest part 12 feet, but allowing for the dip its real thickness is probably 6 to 9 feet." The doctor emphasizes the position of the seam with relation to the surrounding rocks, stating that "the coaly material does not form a bed as in a true coal seam, but cuts across the slate, which has a strike of about 60 degrees east of north." He classed the material itself as anthraxolite, a name applied years before by Professor Chapman of Toronto University, to a similar substance found in Eastern Ontario and other parts of Canada. It closely resembles anthracite, but the latter is held to have been derived from vegetable matter and is found in beds associated with rocks containing carboniferous or later fossils, while the term anthraxolite implies a derivation from bituminous matter such was contained in the beds of slate adjoining the seam. The vein cutting very ancient slates, as Dr. Coleman points out, the inference was obvious that it must have reached its present position long after the rocks were formed, and was therefore not of contemporaneous or previous origin. Anthraxolite or anthracite, the substance burned, and gave a good heat, as appears from the statement of the Government diamond drill operator, who used it to raise steam in the boiler of the drilling plant. "The waste" however, adds the driller, " was considerable. It took close attention by the fireman to keep the ashes away and I should judge that fully one half was waste."

Dr. Coleman describes the pure mineral as black in colour, resembling anthracite or albertite, and forming small plates or irregular cubic blocks, the largest observed being three-quarters of an inch square. Between the plates or cubes there was generally more or less quartz, and in some weathered portions on the surface the quartz remains as a porous cellular mass. He noted that the quartz varied in amount, specimens from the bottom of the small pit containing less than those from the surface.

The Quality And Quantity Of Anthraxolite

As regards the probable extents of the deposits, Dr. Coleman thought there might be some thousands of tons, and expressed his conclusion as follows, "However large this vein of anthraxolite may be it is not likely that it will supply quantities of fuel comparable to those of the coal regions, where the beds often extend for many square miles." Further, "unless the percentage of ash proves less when the vein is sunk upon, the quantity of quartz mixed with the mineral will prove a serious draw-back for metallurgical purposes."

The report of Dr. Ellis showed that a selected sample contained 90.10 per cent. of carbon and 4.10 per cent. ash, while analysis of an average sample showed 74.20 per cent. of carbon 20.50 per cent. of ash. Another sample yielded 36.5 per cent. ash. It differed from anthracite in containing less volatile matter. Dr. Ellis compares this occurrence with others from the vicinity of Kingston, Lake Superior and district of Ungava, also with graphitic anthracite from Rhode Island, and assigns its origin to bituminous as distinguished from vegetable matter.

Geological conditions are not likely to change materially in 26 years, but as additional occurrences of anthracite were being alleged and large claims made as to the possible or even probable existence of an important supply of fuel in this area, the Department of Mines had another report made a few days ago by C. W. Knight, Associate Provincial Geologist of Ontario, whose professional standing is well known. Mr. Knight's report is herewith appended. It will be seen that in all important aspects it corroborates that of Dr. Coleman, and that his estimate of the quantity of fuel available is much less. The presence of fossils of carboniferous age has been adduced in support of the coal bed theory. Mr. Knight shows that these fossils instead of being in place were found in the pebbles of gravel deposits in all probability transported by glacial action, from a long distance away.

As to the name to be applied to the material, Mr. Knight prefers "anthracite", but as he states this is a minor matter. A rose by another name would smell as sweet, so also anthracite or anthraxolite by any other name would burn as well and leave the same proportion of ash. The important points are the quantity and quality of material, and the report of Mr. Knight is emphatic on both. It is addressed to Deputy Minister of Mines Gibson.

Mr. Knight's Report

Acting under instructions from you, I visited on July 19th and 20th, the anthraxolite area at Chelmsford about thirteen miles west of the town of Sudbury, Ontario. I was accompanied by Mr. James Bartlett, Inspector of Mines.

Briefly summarizing the results of our two days' examination, I may say that we found no reason to disagree with the views held by A. P. Coleman as published in the Sixth Report of the Ontario Bureau of Mines, pages 159 to 166. Dr. Coleman believed that coaly material (anthraxolite) occurred in a vein cutting the slate beds. We are in accord with this view. The occurrence thus differs in origin from true anthracite coal seams which always occur interbedded with, not cutting, shales and sandstones.

While the mode of occurrence of the anthraxolite veins at Sudbury and of the true anthracite seams is quite different, I feel, nevertheless, that the distinction given by the name anthraxolite is an artificial one, since the analysis of the pure material from the Sudbury occurrence shows it to have the composition of a very pure anthracite.

But apart from the minor question of a name for the coaly material we must remember that there are only two important points to consider: first, how much of the coaly material is in sight, and, second what is the quality of the material.

As to the first question, one may say that there are only a few hundred, or at most a thousand or two, tons in sight; I would prefer to say a few hundred tons.

Then as to quality, while the pure coaly material shows on analysis to have as high a per cent. of fixed carbon as 90 per cent and as low an ash content as 1 per cent., still the point to be remembered is that the coaly material is mixed with quartz and that this impurity brings the ash content up to as high as 36 per cent. — a very poor grade of coal.

It is hardly necessary to add that if a vein of the pure anthraxolite were discovered, giving an output of millions of tons, it would be an important event for central Canada.

Now as to details of our examination, I may give the following:

On July 19th we visited the deposit of anthraxolite, described by Coleman, in Balfour township, on lot 10 in the first concession. The vein of anthraxolite strikes north 38° east and dips to the southeast at an angle of about 50°. There is a pit about 30 feet long, about 12 ft. wide, and up to about 16 feet deep. At the bottom of the pit an inclined shaft, not timbered, follows the vein down at least 18 feet, and how much farther we could not determine owing to water in the shaft. The vein at the water level, namely 18 feet down the shaft, had pinched down to a few stringers only several inches in width. In the pit it may be seen that at the northeast end the vein pinches out completely. In the centre the vein suddenly widens out to a width of at least eight feet, and then at the southwest end almost pinches out again. This lens was worked last fall, and a shipment of 51 tons made to the Nukol Co. in Toronto. It would be well to confirm this statement through the Nukol Company.

The vein occurs on the south slope of a hill of black slate which rises above the low ground 35 feet. The southwest part of the vein is covered by the dump, and beyond that, the vein passes into the low ground and is covered with drift. At the time of Dr. Coleman's examination, many years ago, before the dump covered the southwest part of the vein, it was found that the vein had a length of seventy feet.

On the same day, July 19th, we visited another deposit of this coaly material which has been found about 4½ miles northeast of the one above described. This is a small one consisting of a few veins an inch or two wide, with larger pockets in the vein perhaps 8 or 10 inches in width. Their length was not traced. These occur on lot 4 in the 5th. concession of Balfour township, at the side of the road. A rock cut in the Chelmsford sandstone had been put through at this point to drain a swamp, and the anthraxolite veins were discovered in this rock cut. I do not think this occurrence has been described in any report.

Fossils In Gravel Pit

The next day, July 20, we were joined by Mr. C.B.W. Anderson, representing the Ontario Anthracite Mines Ltd. I want to say this for Mr. Anderson: he answered, frankly and truthfully, all questions which were asked him, and we found no intention on his part to misrepresent anything.

We asked Mr. Anderson to take us to the place where it was reported that fossils of Carboniferous age had been found. Guided by him we motored to Phelan, about 8 miles in a straight line west of Chelmsford. Here there is a great deposit of gravel which the C.P.Ry uses for ballast. Mr. Anderson told us that the fossils were found in this gravel. It is hardly necessary for me to tell you that any fossils found in this glacial deposit are of no value in determining the age of the rocks of the Sudbury basin, since any fossils in the gravel have been carried probably for hundreds of miles from the northeast.

We therefore asked Mr. Anderson if he knew of any place in the Sudbury basin, where he could show us fossils in the solid rock. He said he knew of no such place.

This disposes of the claim that fossils of carboniferous age occur in the Sudbury basin.

The same day, in company with Mr. Anderson, we visited another occurrence of anthraxolite about a mile and a half southwest of Chelmsford, on lot 4 in the second concession of Balfour. Here, in the centre of a field, there is a shaft in black slate down, it is said, 48 feet. It was full of water to within 10 feet of the surface. On the dump there are a few specimens of anthraxolite about the size of one's fist. There is also a piece of the black slate weighing 100 lbs., in which there are a few small stringers of the coaly material. Presumably, this big piece of rock has not been brought from elsewhere.

You may now see from the above descriptions that the occurrence of anthraxolite west of Sudbury is more widespread than it was originally thought to be. It is reported, indeed, that there are other occurrences of the material in the area.

KASLO CREEK PROPERTY CHANGES HANDS

The Gibson mine, South Fork Kaslo Creek, was sold at auction by the Sheriff at Nelson recently. The Company controlling this silver-lead property was forced into liquidation some two years ago. It was bought for $76,000 by mining men of Portland, Oregon, and Spokane, Washington. The dead had scarcely been completed when news was received that all surface equipment and buildings, valued at about $30,000, had been destroyed by forest fire.

British Columbia Letter

A Definite Move for a B. C. Iron and Steel Industry

Representatives of the Coast Range Steel, Ltd., have submitted proposals to the British Columbia government having in view the establishment of an iron and steel industry. They claim to have the assurance of the Trade Facilities Committee of the British Government of support to the extent of one-third of the estimated cost. This will amount to $4,000,000. They assert also that the Dominion Government has promised backing not to exceed the same figure. These agreements were conditional upon the Province guaranteeing interest and principal upon bonds up to another $4,000,000. Thus the project is expected to represent an outlay of $12,000,000. Under the circumstances the British Columbia Government undertook to support the Coast Range Steel, Ltd. Those interested in the company were told that the Government would be prepared at the next session of the Legislature to submit legislation, making the iron ore bodies of the Province available for use either on a percentage, tonnage or royalty basis; that the present legislation providing for a bounty on pig iron produced in B. C. would be repealed; that the Government would promote legislation, authorizing a guarantee of the Company bonds to the extent of one-third of the amount required to establish an iron smelting plant; and that this guarantee would be conditioned upon the Dominion Government and the Imperial Trade Facilities Committee, guaranteeing the other two-thirds of the capital required; upon a thorough investigation being undertaken covering raw material, plans, specifications, locations, contracts, conduct, management and financing of the Company and probabilities of success satisfactory to the Government; upon the Government of the Province having security for its guarantee ranking equal with the security of the Dominion Government and the Facilities Committee; and further it being understood that if the operation of the blast furnace to be established is fully satisfactory, the guarantees will be extended to include the erection of a steel-producing plant and also rolling mills. It is noted that this is not a full endorsement of the Coast Range Steel proposals. The latter contemplate a plant with a daily capacity of 1,000 tons of pig-iron together with auxiliary plant for the production of steel rods, tin plate, etc. The Government felt that this perhaps was providing too large an installation for a beginning, and therefore have gone on record as favouring a plant capable of a daily production of 400 tons of pig iron, the auxiliary plant needed for the production of steel rods and steel in other merchantable forms to be left for consideration, pending the successful inauguration of a blast-furnace industry.

The Portland Canal District

Important strikes have been reported from the Portland Canal District. One of these occurred on the Big Missouri Group and the latest information available would seem to indicate that the outlook for this property is bright. Another is on the Betty Group, near the divide on Salmon River. This is being operated by the American Mining & Milling Co. A shipment of 10 tons of the ore lately uncovered will be made shortly to the Tacoma smelter.

Pat Daly arrived in Vancouver recently from Stewart. He is of the opinion that there is to be at least one more Premier Mine developed in the Portland Canal district, and thinks that the Daly Alaska Mines Inc. has as good a chance as any of opening up such a property. This company has taken over a group of claims just across the boundary in Alaska from the Premier. Mr. Daly says that there are some high-grade showings on these properties and that the work done so far has given him confidence. He is advocating the establishment of a large smelter for the treatment of the output of the country back of Stewart, and thinks that the best site for this would be somewhere on the Skeena River.

The Esperanza Mine, Alice Arm, has been taken over by Norman Frazier and associates, who have found local capital to pay for further development. The financial consideration for the acquirement of the property was $35,000 of which $10,000 was paid in cash.

Lord Byng in Klondyke

Lord Byng, Governor-General of Canada, and party are visiting the mining camps of Mayo City and Keno Hill near Dawson City. Since reaching the Yukon, they have been touring the Klondyke gold creeks. The Governor-General inspected the hydraulic dredging operations near Dawson which now are producing upwards of $2,000,000 worth of gold annually.

Silver Find Reported in Alberta

Apparently well authenticated news has been received of an important find of silver in the barren lands northeast of Edmonton, Alberta. Mineral has been discovered which is said to be at least equal to the silver ores of Cobalt, Northern Ontario. This news is substantiated by remarkable samples of silver ore brougtht into the Northern Trading Company's post by Jack Sarcee. Hume and O'Neil, geologists, say that the find is very valuable. One asserts that the ore will run $800. a ton, while the other makes an estimate of $775.

Bayonne Group to be Developed

B. N. Sharpe, of Spokane, James Grant, of Nelson, and W. Grant, Cranbrook, have left for the Bayonne group of mineral claims, where good values were struck recently in sulphide ore. A saw-mill is being installed to cut lumber for building bunk-houses and other service buildings, and the mine is to be equipped with a compressor in order to speed up development.

B. C. Miners for Manitoba

Frank Phillips, Superintendent of the Selkirk Mining Co. Rice Lake, near Lake Winnipeg, Manitoba, has been visiting British Columbia to obtain a number of practical miners for work on this property. The Selkirk mine, he says, is being actively developed and a new mill is under construction. Its ore assays from a $130 to $175 in gold per ton. Work now is going on in a large new body of milling ore, which will average about $14 a ton. Among the latest additions to the camp is a radio apparatus, through which the miners may be kept in touch with the outside world.

New Orebody on Arrow Lake

The Monarch and Big Lead Syndicates' property on Pinxton Creek, Upper Arrow Lakes, have shown in their development a well-mineralized ore-body. It has zinc-silver-lead values and from surface indication there is a large body of it.

News and Comments

By ALEXANDER GRAY

Making Merrie Sunshine

Report has it around the King Edward lobby in Toronto that the Scottish Ontario property has been acquired by people who steadfastly hold to the belief that Northern Tisdale will not come into its own until a depth of a thousand or two feet is attained. It would be pleasant to have the ground prove its worth on which the Bannermann Brothers staked in the earliest days of Porcupine, and who kept open house for all comers some of whom staked the cream of the Pearl Lake section. A good deal of money was put into the "north end"—much of it foolishly, some of it intelligently—but Peter MacLaren was alone in his optimism, as the representative of Glasgow interests. The Hughes, Scottish-Ontario, Dobie, Crown Chartered, Davidson and Smith Veteran claim, all had an innings. If Mr. Bowman and his associates are prepared to demonstrate that they have a deep-level proposition, and have the money without asking the public to contribute what such explorations will entail, they deserve to succeed.

Hollinger to Have Power

Negotiations with the Government have resulted finally in the concession to Hollinger Consolidated Mines of a water-power that will meet the needs of the company, and to spare. It became imperative that mines that have exceeded all present power facilities should have the heartiest co-operation on the part of the Government, in order that development, production and milling capacity be increased. Three companies at Porcupine and five, for the time being, at Kirkland Lake are the mainstay of gold mining. By their standards the gold industry of Ontario will be judged. Hollinger Directors have moved deliberately. Knowing what they must have, if they could not have abundant power from one source, they knew they could have it from other sources. Whether the power development will cost two and a quarter or two-and a half millions, is a detail. The money is there, and when the amount to be set aside is established, Hollinger shareholders will learn something to their advantage. Profits are at the rate of more than twice the dividend requirements, and the surplus, apart from what the power development will cost, is sufficient to carry any increase of dividend, even though the profits are not on the ascending scale, as they will be.

Albert Freeman in Retrospect and Otherwise

From his office in Fifth Avenue, on personal letter heads which give his cable and business address, Albert Freeman, erstwhile of the McIntyre Company, and the real author of those "King Solomon's Mines" romances that landed two others in a Southern retreat, explains why he writes to Hollinger shareholders, thus:

> "I have, of course, an object in telling you this. My friends, who risked their money with me in McIntyre, joined me recently to obtain control of a large Canadian enterprise of very great promise, and I have undertaken to sell an issue of 10 per cent Ten-Year Gold Notes, with a stock bonus of 150 per cent, of which 50 per cent is 8 per cent Cumulative Preferred, and 100 per cent Common. So that, with a $1,000 *amply secured* Gold Note, $1,500 stock bonus is allotted, which is calculated to yield very handsome profits.
>
> "I recommend this investment and wish to emphasize that this is another opportunity to make a lot of money."

It is a decade or so since Albert Freeman "bought for $250,000" the McIntyre Mine, "and then financed, developed and managed" it. Undoubtedly "the financing was not easy; and when the shares went begging at 30c—the proverbial 30c—the wise prophets, mostly with elbows sticking out of their coat sleeves, proclaimed, that they wouldn't give 30c for the mine."

Crediting *The Northern Miner* with the prediction that Hollinger would produce four hundred and fifty million dollars to a depth of 3,000 feet, and stressing that the McIntyre "produced almost $12,000,000 since," Mr. Freeman returns to the bat. Recipients of his personal panegyric may regard his tale as another form of aphasia. While no one questions his identification with the McIntyre, he cannot question the discretionary right of Canadians to decline to forget what happened to the son of Nathaniel Hawthorne, and others. At least one profession, that of journalism, never can reinstate Mr. Freeman as a leader to whom they can entrust $1,000, more or less, and do it repeatedly. He is a dulcet person of undoubted ability. The difficulty he experienced in financing the McIntyre was of his own making. His literature is quite a shock, and should have been accompanied by a shock absorber.

Get the pulmotor—give the public a douche of ice water—roll them over! Mr. Freeman must understand there is a dead line at the Canadian border.

Gold by the Pound in Labrador?

It is a secret. As such it is not permissible to divulge the locality. Along the coast, up a river—and then some—a party of timber cruisers did not find what they were after. In a creek their curiosity was aroused by interesting-looking gravels. They took some and when they came out they weighed the parcel. It went 25 lbs., and when they panned the stuff they recovered ¼ lb. in nuggets and fine gold. That is good enough—$3,600 to the ton, without getting to bedrock. As a grab sample result it suggested action; so another expedition has gone thither, headed by a sourdough, well known in Rossland, Cobalt, and elsewhere in the North Country. If there is anything like that in quantity, the fortunate finders will require a belt conveyor for the nuggets. By putting the hose on a broad face, or operating a dredge, the basis for a rush might be forthcoming. The vicinity of Spanish Lake, and Keithly Lake and Cedar Creek waters in British Columbia, may not have it all their own way. The Labrador season is short, but that would not be a deterrent if the alleged find is verified. Another Klondike and Yukon on the eastern seaboard would have advantages sourdoughs would appreciate.

The presence of tourmaline in veins is recognized as evidence of former high temperature conditions. This is interesting in connection with the occurrence of tourmaline in the gold veins of the Porcupine, Kirkland Lake, and Goudreau fields. With the high temperature may be connected the idea of persistence with depth.

Notes From Nova Scotia

SAFETY WORK AT SYDNEY MINES AND MILLS

Those who have been in close touch with the work of the Safety Department at the Sydney steel plant and the Glace Bay collieries during the past two years recognize that good work has been done and much progress made in the way of prevention of accidents. Being a comparatively new department with no statistics running back over a sufficient period of time for comparison, it is difficult to give an accurate statement of each year's work showing what has been really accomplished. Common observation assures us that the work is being carried on along right lines and only requires perseverance and "push" to achieve even greater success.

Safety a Psychological Affair

The amount of literature on safety work that is being published and circulated among the workmen of all large industries in all industrial countries is enormous. Educational campaigns are being conducted on the principle that "constant dropping wears away the rock". With this in mind and with the purpose of having the workmen permeated through and through with a thought that they are their own and their brothers' keepers, safety departments labour assiduously to awaken interest, arouse attention, and cause men to think.

All accidents, whether slight or serious, are calculated to make men think. This is Nature's way of arousing attention, and when reflection is sufficiently deep and strong, action is generally taken along lines of prevention. But it is not enough that men who have been injured should think and act; supervisers of workmen must do their share of it,—indeed they must be the leaders. Their thoughts must be expressed for the benefit of others passing along the same way. Their plain duty is to warn, and sometimes to command. Their relation to the Company which they serve and the general public demands that their experience be incorporated into the sum of human knowledge, that it may be used for the benefit of the whole human race. Hence we have new departments springing up, and whether we designate these under the head of safety, welfare, social or industrial, they are all part and parcel of the one division of industry that has to do with the human side.

Safety Pays

Just as cities and towns have come to recognize that vital statistics measure a distinct financial loss or again, as well as their standing in the scale of civilization, and likewise teach them that each child born must receive the best possible care that it may live and become a useful citizen, so large industries have come to see the financial loss sustained when a workman is killed or seriously injured and the discredit that follows when the accident rate is abnormally high.

The railway, steel, and coal mining industries are hazardous occupations. The catastrophes that sometimes occur in all these callings shock us and make us wonder if man will ever be able to master thoroughly the elements of danger which at times appear with lightning rapidity, do their deadly work, and pass on, leaving us for the moment dazed and doubtful of our own ability to cope with the forces we have discovered and set in motion and which we fail at times to control. The complexity of machinery in large industries leads to accident. This is recognized and men have set themselves to reduce the danger of working around these great machines. Organization, education and mechanical safeguards are the preventives used, and they have been found most successful. In the large steel works of the United States, good results have been obtained by these means and the accident rate has been greatly reduced. This has been brought about by the hearty co-operation of the employer and employee, working together with the one thought in mind that a complex industry with its great variety of machinery presents dangers that can only be overcome by the constant care and watchfulness of every man, from the gate keeper to the General Manager.

Safety in the Steel Plant

What these large works elsewhere accomplished, we can accomplish in Nova Scotia. If they have succeeded in large measure in preventing accidents by studying the causes of accidents, so can we succeed by following their example.

The steel workers of Sydney were among the first to recognize the importance of grappling with the safety question, and when, after placing Safety Guards on dangerous parts of machinery and hazardous places, the management invited the workmen to form committees in the different departments to aid in safety work, there was a response that has brought about good results.

The steel plant can now be said to be fairly well organized, and through the system of forming committees from each department to work with the foreman and the Safety Inspectors for a period of six months, after which they retire in favour of new committees, the whole body of workmen is being gradually educated and imbued with the spirit of safety. The effect of this has been felt all over the works, and while there are still too many accidents, yet the number has been much reduced and in some departments has been reduced almost to zero.

Superintendent Bischoff, in a talk to the Safety Committee a short time ago, stated that there were three general causes of accidents; first, general conditions for which the management was largely responsible; second, the efficiency of the foreman in charge and his interest in the welfare of the men under him; third, the morale of the men themselves. The Company, he stated, must see that conditions in the works are made and kept as safe as possible; the foreman in charge of each department must see that workmen run no unnecessary risks, and must feel that he is largely responsible for accidents; while the workman who keeps continually getting hurt loses his morale and nerve and eventually becomes unfitted to carry on. Such advice as this from the General Superintendent of a large steel plant is calculated to show the workmen that the Company fully realizes their responsibility towards them.

Education the Principal Means to Safety

A few weeks ago safety organization as a whole was dealt with in these columns, showing the work from the general committee down, and it is not necessary to repeat the story. Experience has taught that lack of organization is responsible for two-thirds of the accidents that occur. This being recognized, education was at once begun, and must be continued, and it becomes as much the duty of the management to see that the means

of education is provided, as it is the duty of the workmen to be willing to acquire it and assist in spreading it among his fellow-workmen. If sixty-six out of every one hundred accidents can be averted by knowing how to prevent them, why should they occur? Knowledge in all cases means life and health and soundness of body.

Miners Prefer First-Aid Stations

It is not always easy to enlist the sympathy and secure the support of workmen, even in their own interest. There may be various reasons for this attitude. The colliery workers, while invited like the steel workers to appoint safety committees, did not respond, but on the other hand many miners attended the first-aid classes and made themselves proficient in the art of giving first aid to the injured. This led to the erection of first-aid stations at every colliery. These are well equipped and are models of cleanliness. Injured workmen are beginning more and more to find their way to these stations, and before long they will be looked upon as part of the mine equipment and no colliery will be complete without a dressing station.

Mechanical Guards a Necessity

If education can account for two-thirds of accident prevention, safety guards account for the other third. Education has to do with the human element, safety guards with the mechanical side. Where the human element fails, mechanical skill assists. Trained intelligence may greatly strengthen that first great instinct within the human breast, self-preservation; but man's courage urges him to take chances. Safety guards are erected to discourage these gambling tendencies and to hinder all foolish attemps at such. True, before safety guards came into general use, the workman had no alternative than to take chances. Now he is deterred in every way. He goes to the emery wheel to sharpen tools or grind down some piece of machinery, but he must wear goggles. In handling electric wire, he must wear rubber gloves and be thoroughly insulated. And so through the whole works, as far as possible the machinery is safeguarded and the workman himself is rendered immune from accidents by intelligence, skill and all other known protectors.

Cost no Longer the First Consideration

Cost is not considered where life is to be protected. Safety comes first, quality second, and cost last. Thus we have an entire change from twenty years ago, when output was the first consideration, quality second and safety last.

While there may not be accumulated data by which comparisons may be made, there are outstanding proofs that we have progressed far and are making good headway. Compensation Board records shows that septic cases are not now so numerous and so serious as formerly. This is due to the improved sanitary conditions of the works and to treatment at the first-aid stations before the workman leaves the mine or the department in the Steel plant where he was injured. In the month of May, fifty-six men were treated at the first aid stations at the collieries and in June forty-seven were attended. As blood poisoning sometimes arises from slight wounds, who can tell how many lives were saved, what suffering or financial loss was avoided by this first aid treatment?

The First-Aid Stations

At some of the larger collieries, permanent men are placed in charge of these first-aid stations. But at other collieries some trained workman gives first-aid when the injured man reaches the surface. Many severe cases are now being skillfully cared for underground. A short time ago a miner was severely injured while at work. A fellow workman nearby attended to him and although the case was one where loss of blood would have caused death in a short time, the work of bandaging was so well done that he was taken straight to the hospital from the mine. Another case two days ago aptly illustrates what our miners are doing. A large flat slab of rock fell from the roof on three miners, pinning them underneath. All were severely injured. One man by the name of Dawe, usually a quiet person, when approached by the reseuers told them to attend to the other two men first. When Dawe was examined it was found he had sustained a compound fracture of the leg above the knee. But one of the trained first-aid men was equal to the occasion and applied the splints as dexterously as if he had been an army surgeon. This case also passed on to hospital without having to be cared for at the first-aid station.

Accidents to Eyes Reduced

A class of accidents that has been greatly reduced on the steel plant is that of injury to the eyes. To-day serious cases of these rarely occur. This is largely due to the regulations of the plant that men chipping steel, breaking pig iron, or doing any other such work must have their eyes protected.

All accidents are investigated by the Inspectors and the causes ascertained. They are divided into two classes, preventable and non-preventable. The causes of preventable accidents may lie either with the manager or with the workmen. When these causes are made known, steps are taken to remove them. The safety department fills a large place in that it is free to discover and make known the cause of accident irrespective of whether the management or the employee is responsible.

(Continued from page 551)

Table 2, Imports of Bituminous Coal by Grades and by Provinces

PROVINCE	Round, and Run of Mine: Total for Yr. to date 1922	Round, and Run of Mine: 3-Yr. Aver. for Period 1919 - 20 - 21	Slack: Total for Yr to date 1922	Slack: 3-Yr. Aver. for Period 1919 - 20 - 21	per cent. of (1) to (2)	(3) to (4) per cent. of
N. S.	2,578	1,620	988	235	159.	120.
P. E. I.	619	103	736	...	601.	...
N. B.	19,387	3,305c	33,599	17	587.	197,641.
Quebec	648,924	1,138,557d	193,195	262,877	57.	73.
Ontario						
Central	2,631,849	3,820,263	726,275	759,558	69.	96.
Head of Lakes	11,726	595,511	...	50,246	2.	...
Man.	17,390	15,151	30,366	16,375	115.	185.
Sask.	266	302	871	519	88	168.
Alberta	360	223	397	293	161	135.
B. C.	5,349	4,820	128	1,326	111.	32.
Yukon	17	5	...	.	340	.
Total	3,341,465	5,579,863	986,855	1,091,446	60.	90.

Table 3, Exports of Canadian Coal

	Total for Year to date 1922	3 Yr. Average for Period 1919-20-21	p.c. of (1) to (2)
Eastern Canada	282,245	612,222	16.
Western Canada	565,798	586,961	96.
Total	848,033	1,199,186	71

Note:
a — includes 3,446 tons imported from Great Britain
b — includes 552 tons imported from Great Britain
c — includes 1,484 tons imported from Great Britain
d — includes 2,610 tons imported from Great Britain

Northern Ontario Letter

The Hollinger Dividend Rate

The official statement of one of the directors of the Hollinger Consolidated that the stockholders might reasonably expect an early increase in dividends has aroused widespread speculation in Porcupine. It has been intimated here that the increase will be either to five per cent. quarterly or two per cent. every four weeks.

Such an increase in dividends can be taken care of with the present mill of 4,000 tons daily capacity. Any further dividend increase would then be governed by the progress made in connection with enlarging the mill to 7,000 tons daily capacity, as officially declared to be the intention of the company.

The income of the Hollinger has been running at the rate of about one million dollars a month during the current year.

Diamond-Drilling on Newray

The work of exploring the Newray property is now well under way, and the chances of success are regarded as being favorable. Diamond drill cores will be drawn from more than a third of a mile in depth, with a view to determining the position of the intruding porphyry formation and the possible location of ore bodies. The first hole is already down about 650 feet, running at an angle of approximately 70 degrees. This is intended to encounter contact at a depth of about 1,500 feet. All holes will be driven in the basalt formation, pointing toward the intruding porphyry, and will be made to bottom in the latter formation at points a short distance past contact.

There are some high-grade patches of ore in the old workings of the Newray and there is a considerable tonnage of low-grade ore. With these facts to go on, and with favorable geological structure right on the strike of the Hollinger-McIntyre producing areas, it is generally believed that the odds are in favor of the Coniagas Mining Company meeting with success on the Newray.

Prospecting on the Kirkland Gateway

Encouragement has been met with in the new work on the old Lucky Cross property, now known as the Kirkland Gateway. Surface work has resulted in the discovery of visible gold in a promising surface vein. Effort will be directed to points in close proximity to porphyry formation, the former work having been confined almost entirely to the quartz veins lying in schist formation. This change is based on successful experience of other mines with similar geological structure.

The Reported Negotiations for Teck-Hughes

The latest unofficial reports in Kirkland Lake are that the Consolidated Goldfields of South Africa are bidding for control of the Teck-Hughes. Charles L. Denison, president of the Teck-Hughes, has just concluded a trip to the mine and has left the district greatly pleased with the situation. From the information available today it would appear as though negotiations are in an advanced stage. It is said that an endeavor is being made to secure also the Orr Gold Mines, as well as the Elliot-Kirkland, the latter lying to the west of the Kirkland Lake Gold Mines and held by former owners of the Seneca-Superior Mine of Cobalt.

The magnitude of developments in the goldmines of this country is tending to attract world-wide interest and the result is that there is probably more capital available for investment in good gold properties than ever before in the history of gold mining in Canada.

Prospecting the Brookbank Claims

The result of diamond drilling operations on the Brookbank claims in the township of Holmes has been sufficiently encouraging to lead the Coniagas to continue the work. Some wide veins are in evidence and these carry encouraging mineralization. One unfavorable geological feature is said to be the absence of porphyry intrusions.

Kirkland Lake's July Production

Official figures secured by the representative of the journal go to show what an important part the mines of the Kirkland Lake district played in causing the production of gold from Northern Ontario to reach a new high record in July.

Normal production from the Wright-Hargreaves, Lake Shore, Kirkland Lake and Kirkland Lake Proprietary, together with an increase at the Teck-Hughes, brought the aggregate yield from the Kirkland Lake gold area to approximately $250,000 for the 31-day period, or actually more than half a ton of gold bullion during the month from the mines of this comparatively new field.

About 700 men now find employment at the mines of Kirkland Lake, the monthly pay-roll exceeding $100,000 by a substantial margin. In addition to this may be included a large number of prospectors doing assessment work on outlying mining claims,—blazing the trails, as it were, to possible new producers of gold.

In the town of Kirkland Lake the sound of hammer and saw are to be heard from daylight until dark, telling a story of anticipated expansion and the necessity for more places of business and greater housing accommodation. Everywhere one goes, people are found living in rather cramped quarters, while well-situated building lots are at a premium and rentals for mere shacks are almost on a par with fine city dwellings. It is the old tale over again of enterprising pioneers making a bid for participation in the prosperity which inevitably goes hand in hand with the increasing production of gold.

Wright-Hargreaves

During the month of July the Wright-Hargreaves produced close to $80,000, the output being the second highest so far recorded at this mine, and only exceeded by the June production, which up to the middle of the current year was the largest month's production to date from any mine in the Kirkland Lake district.

Underground developments have shown that there are two important veins at the 700-ft. level, the general dip being such as to hold out prospects of the two deposits merging at greater depth. The development of these veins at the probable junction point is one of the very interesting features of future operations on this mine.

The current gross production from the Wright-Hargreaves is at the rate of approximately 33 p.c. of the total issued capital, and the net profits amount to about 15 p.c. In addition to this, a large amount of development work is being done and a big ore reserve is gradually being stored up. These operations are paving the way to an ultimate enlargement of the mill to possibly double its present capacity.

A two-story building for the accommodation of company employees is nearing completion. This building will have about 40 rooms and is one of extremely modern design. In addition to this are a number of six-room dwellings for the accommodation of members of the staff.

Achievements in the mine and mill as well as construction work on surface tend to lend an air of permanency to the Wright-Hargreaves, and it is clearly evident that the management regards the prosperity of the mine as a fixture for many years to come.

The Porcupine Gold Belt

The fact that two of the high-grade ore-bodies on the Dome Mines are running in the general direction of the Preston-East Dome Mine is arousing considerable interest in that property. This property lies adjacent to the Dome on the south-east.

The fact that the McIntyre-Porcupine has taken an option on the Schumacher Veteran claim which lies to the north of the Dome is pointed to as concrete evidence of the belief of experienced Porcupine miners that the mineralization in the Dome area may be more extensive than has heretofore been supposed.

Added to this is the fact that the consolidated properties of the old West Dome and Dome Lake are proceeding with plans to carry on deep mining operations, while farther west there is a movement on foot calculated to finance a general exploration and development campaign on the promising Gold Centre property.

Everywhere throughout the Porcupine area is a tendency among mining men to search out mining claims where porphyry formation intrudes the basalt. This is the geological structure where the vast gold-ore deposits of the proven mines have been found to lie.

While the Porcupine field has heretofore been divided into two producing sections, known respectively as the Hollinger-McIntyre and the Dome areas, there is gathering evidence that work in each of these sections may extend so as ultimately to connect with one another and thereby give to the field proportions far greater than before thought possible.

The Porcupine area is now producing approximately three tons of gold bullion every thirty days. From this fact may be measured the importance of a broadened scope of operations.

The Pancake Lake Prospect

The Crown Reserve Mining Company is working away quietly on its property in the Pancake Lake section of the Larder Lake gold area. The first objective is a depth of 300 feet, at which horizon the diamond drilling operations indicated the presence of commercial ore. The shaft is already well on its way to a depth of 200 feet, and encouraging quantities of visible gold have been encountered.

Optional Route To Matachewan

Representation has been made to Hon. H. Mills, Ontario Minister of Mines, to have road work to the Fort Matachewan district directed from Elk Lake. The representation is based upon what are claimed to be natural road building advantages, that is, following the trend of rivers and valleys.

On the other hand, at Swastika there is a well organized endeavor under way with the object of constructing a road from Swastika to Fort Matachewan, this work being based upon the belief that Kirkland Lake and Fort Matachewan must eventually be connected for the reason that the strike of the gold bearing formation of Kirkland Lake is generally in the direction of Fort Matachewan.

Reported Silver Discovery

The reported discovery of silver in the district through which the James Bay extension of the T. & N. O. Railway is to pass, has been found to have originated through a prospector bringing in a sample of silver ore which had been given to him some years ago and represented to have been taken from a vein in that district. This prospector has visited the field and has made the discovery that the geology is identical with that described, but no trace of silver-bearing veins has been located. Another expedition is being planned. This is the information secured by the Journal from Arthur A. Cole, mining engineer for the T. & N. O. Railway.

Coniagas Production

Before the end of the current year the Coniagas mine at Cobalt will have yielded approximately one million tons of ore containing about 31,500,000 ounces of silver, or an average of over 31 ounces of silver from each ton of ore.

The Coniagas will close its fiscal year Oct. 31st and will show a production heavier than in either 1918, 1919 or 1920. The ore is now averaging about 10 ounces of silver per ton, despite which fact a substantial profit is being made. It has been considered wise, however, to pass up the dividend for the current quarter so as to be in a position to meet the expenditure in connection with an effort to secure a profitable gold mine. Dividends to date exceed $11,000,000.

Nipissing

Producing at the rate of close to 3,000,000 ounces of silver annually, but with its Cobalt mine growing old and with over four and a half million dollars in surplus, the Nipissing Mining Company is making a world-wide search for new mines. The company has six scouts in the field, two being in Ontario, one in Manitoba, one in British Columbia, one in Mexico and one in South America.

The Nipissing has produced approximately 64,000,000 ounces of silver from its Cobalt properties since 1904, with a value of about $43,000,000. The company has paid $24,360,000 in dividends, the current rate being 3 p.c. quarterly with a bonus of 3 p.c. in the first and the last quarters, or a total current disbursement of $1,080,000 yearly.

Find In Ossian Township

A gold discovery made some months ago in the township of Ossian in the northern part of the Larder Lake district, is attracting the attention of a number of prospectors. This discovery was made by Frank Fishley, a prospector who has been in this part of Northern Ontario for the past 15 years or more. Ossian township is in Ontario, adjacent to the inter-provincial boundary. The find is in line with the probable course of the Kirkland Lake series of formation, and this fact lends interest to the discovery.

THE CONVERSION LOAN

(From *Journal of Commerce*.)

Last week the Minister of Finance issued his statement relative to the Government loan operations. As had been anticipated, the domestic loan which it is intended to launch will take the form of a conversion loan. That is to say, investors who purchased in 1917 the Dominion Government bonds that

will mature on the 1st of next December are to be given the opportunity of reinvesting their money in Dominion securities. That is right and proper. The bonds to mature on the 1st of December amount to $178,000,000, and, with such a large loan as that being repaid in Canada, Canadian investors would naturally have felt aggrieved if they had not been given the opportunity of reinvesting in Dominion Government securities. (See page 19.)

Persons who desire to reinvest thus will have issued to them new bonds bearing the same rate of interest as the old, namely 5½ per cent., and either for five years, maturing in 1927, or for ten years, maturing in 1932, as the bondholder may prefer. An advantage to the investor, as the Finance Minister points out in his announcement of the loan, will lie in the fact that, while the maturing bonds will be retired on the 1st of next December, and the interest coupon of that date will be paid, the new bonds to be delivered in exchange will be dated the 1st of November, and will thus carry one month's accrued interest.

On the other hand, the new bonds to be issued will not be exempt from taxation as were those which are to mature on the 1st of December. This we conceive to be absolutely the right course to adopt. Indeed, on general grounds of public policy, we consider that the issuance of tax-free bonds is unwarrantable, and we know that it has, within recent years, formed a much-used weapon in the rhetorical armory of those who take pleasure in grievances anent the special privileges accorded to wealth. However, the fact that the new bonds will not be tax-free, as were the old, may possibly make them less desirable in the eyes of some people. At the same time, as the Finance Minister rightly says, the bonds of the Dominion Government are the very highest class of security that can be offered to Canadian investors, and he makes a point that he is entitled to make in emphasizing the substantial nature of the concession that is being made to domestic investors in offering such liberal terms for renewal of the maturing loan, in view of the fact that the Government's recent loan was placed in New York at a figure that yielded only a little over 5 per cent.

The privilege of investment on the terms outlined above is to be confined to holders of the outstanding bonds about to mature. Arrangements are being made with the chartered banks for the carrying out of the conversion plan, and, after the latter has been completed, it may be necessary (it is stated) to arrange a further loan in which new money will be required. It will be remembered that the Loan Act, passed at the last session of Parliament, gave the Government authority to borrow $350,000,000. The present conversion plan is designed only to meet the maturities of which we have spoken. We believe, as we have indicated before today, that it is possible for the Government to raise such part of the larger sum named as it may require by means of a domestic loan open to all comers. And we shall look with confidence to those entitled to avail themselves of the conversion plan to give, by their alacrity in doing so, an indication of the readiness of the Canadian investing public generally to put their money in Dominion Government securities. — J.

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EDITORIAL

The technical man that commands a good position and a high salary . . . is always the man whose profession is dearer to him than his life, who never counts his time or weighs his labour by his remuneration, but works for love. — Dr James Douglas — 1906.

PROSAIC MINERALS

To Dr Willet G Miller belongs the credit, we believe, of coining that very apt phrase, "prosaic minerals," a term meant to indicate the more common non-metallic minerals that are found in great abundance in Canada and that are the material bases of numberless industries. Of these minerals, gypsum, feldspar, barite, china clay, and quartz, or quartzite, are the most important.

Since all of these minerals are to be found in great quantity in many localities, and since, also, they are all low-priced commodities, the value of deposits of any of them is absolutely dependent upon the cost of transportation. This is axiomatic. Ignoring axiomatic truths is a specialty of the layman when he approaches mining without advice, and it is unfortunately true that most Canadian ventures in prosaic minerals have been gone into without professional guidance. Those that have succeeded, and they are few, have done so principally because failure was more difficult to achieve than success.

The scene is changing, but very slowly, lack of competent direction, absence of technical control and business acumen, is still apparent from Nova Scotia to British Columbia.

Now while it is a fact that Canada is endowed with a rich abundance of prosaic minerals, it is also true that many deposits opened in the past, or now being worked, should never have been touched at all. Neglect of preliminary prospecting has been the prime cause of these missteps. When all these shall have been eliminated there still remains a world of workable bodies of all this category of minerals. Some of these will not be valuable until years shall have elapsed, but enough are known now to satisfy a market ten times larger than that now supplied.

We believe that it would directly serve the interests of our two great railway systems were their executives to bestir themselves in examining and developing the markets for prosaic minerals. A rough idea of the deposits that might supply their lines with freight is easily obtainable. These higher officials have much better facilities for securing market information than has any individual. Indeed we can conceive of few things that would so notably help the operator and the railways themselves as a close and complete report upon the market possibilities for minerals heretofore officially overlooked.

THE STRIKE IN NOVA SCOTIA

In spite of some appearances to the contrary, the strike situation in Nova Scotia is now distinctly improved. At the time of writing, the conference of strikers and company officials is sitting. The fact that they are once more together is significant, though the personnel of the miners' representation is ominous. What we wish to draw attention to particularly is the well ordered nature of the strike —well-ordered in spite of the undoubted influence for the worse of the leaders now accredited by popular vote. It is worth some thought to discover the reason for this observance of the decencies of civilization. It is certainly not due to the presence of the soldiers.

It is not easy to discern, at this time, the influences that are holding in check the wilder and more irresponsible element among the miners. One influence is, undoubtedly, the solid character and the common sense of a large fraction of the Cape Breton colliery workers, derived from their ancestors in Scotland and fostered by the circumstances, in the main congenial to their perpetuation and growth, of life in New Scotland. The native Cape Bretoners are a hard headed, stubborn lot, difficult to rouse, but impossible to hold whenever they are roused. It is not to be wondered at that they have, temporarily, fallen under the influence of false leaders. We are confident that they will in the end see how poisonous is the doctrine that is now being fed them, and will spew it up.

As an earnest of the rational conduct that will prevail eventually among these miners, we have their response to an appeal from one of their number. D W Morrison, mayor of Glace Bay and representative of that constituency in the provincial legislature, appealed to the miners on Saturday last to go back to the pumps and fans. They have gone. Mr Morrison upheld the cause of the miners in the legislature last session when it was proposed to make it a penal offence to abandon the pumps during a strike. He instanced the traditional policy of the United Mine Workers to keep the pumps and fans running under all conditions. His constituents have vindicated this policy and have given the lie to his statement. On being reminded of this by him, they have returned to their duty.

The officials of the Company have adopted the wise principle of non-violence, whatever the provocation may be. They have set the value of human life above that of property. How hard it is for high spirited men to refrain

to the threats of the strikers, we can well imagine. That the officials have carried out this policy consistently is creditable to a degree that few will realize. By avoiding insistence upon their undoubted right to man the pumps and fans abandoned by the strikers, they have likewise made certain of avoiding a recurrence of the murders and massacres that have disgraced strikers and operators alike in the United States. Such forbearance is worthy of the widest recognition and commendation that can be given it. Also, it is so far-sighted and sound a policy that it is already bringing its reward; the pumps and fans are running again.

During this ascendency of Red leaders, the repudiation of agreements, the flooding of mines and the intimidation of those that would save the public property thus threatened, we must not forget that there is much to be said in justification of the miners. The mines are their only means to a livelihood, and a hard-won competence it is at best. The Dominion Coal Company has from the beginning been beset by difficulties, not only natural but those made by man. From time to time the coal mines have been made the subject of financial manipulation that has heaped upon them a heavy burden of debt. The miners have had to work the harder because of the creation of numerous millionaires from the spoils of this legalized robbery. The present management is under suspicion of this social crime, in large measure without warrant. The first proposals for the formation of the British Empire Steel Corporation were so outrageous that they failed of consummation. The time for such obvious and blatant robbery is, we hope, gone forever from Canadian finance. But the name of the proposed merger was retained, and we know that what other part of the original intention, and the miners are suspicious. It is unfortunate that the management of the British Empire Steel Corporation have been unable to refute in a direct, unequivocal way the charges of financial manipulation, to however small a degree, that have been directed against them by the miners. It would clear the air wonderfully were such a pronouncement made.

Meantime we are confident that, under the direction of D. H. MacDougall, himself a Cape Bretoner who has won his way up from miner to vice-president, the Company's side of the controversy will be conducted wisely and well. If only we could be sure of stability and good judgment on the part of the miners' leaders, there would be no doubt of a speedy settlement of the differences that vex miners and managers alike, and that threaten many unoffending Canadians with cold hearths during the coming winter.

GOOD NEWS FOR THE FELDSPAR INDUSTRY

Last week the American Ceramic Society conducted its annual summer excursion through Canada this year. Canada was honoured to entertain the visiting members of the Society, and we are sure that there has been mutual benefit derived from the interchange of courtesies and ideas during the week. Much of this benefit will remain always intangible, and more will become obvious only during the lapse of time. We wish to draw attention to one development that was coincident with the Society's excursion and originally inspired by its activities, though the presence of the excursionists merely afforded an appropriate occasion for its announcement.

The address of Mr. R. F. Segsworth to the excursionists on the occasion of the banquet held in their honour in Kingston last week is reproduced in full on another page. In it Mr. Segsworth announces that a decision has been made, and preliminary steps taken, to form a Bureau of Standards for Canadian feldspar. Queen's University has consented to provide certain facilities for this Bureau, and those that originated the movement have secured the active and hearty support of Mr. E. W. Beatty, who is interested both as Chancellor of the University and President of the Canadian Pacific Railway.

This is a progressive move, the influence and importance of which it is difficult to gauge at present. If pushed to its logical conclusion, it will both regulate and stimulate the production of feldspar in Ontario and Quebec to a degree that has hitherto been impossible. It will be the means of creating a steady market, such as has been available heretofore to only one or two producers of feldspar. It will, by means of a guaranteed product, ensure a much wider market than has formerly been open to Canadian feldspar. It will provide the railways serving the deposit with a steady source of income. Last, but not least, it will induce the employment of trained and competent engineers for the operation of the quarries.

Mr. Segsworth, Mr. Beatty and their associates responsible for this move are to be heartily congratulated on the step they have taken. It is a step along a way that may continue far and may lead to very important developments in Canada's mineral industry.

"WHERE THY TREASURE IS—"

It is often fruitful of result to ponder over sayings that have come down to us through the centuries from the lips of wise men. Many of these succinct philosophies have become axiomatic with us and are part and parcel of our every-day life. Others we regard with a friendly feeling, though we are not yet quite ready to adopt them into the family of our thoughts. Still others of these great and fundamental ideas we acknowledge only in a most distant way, like an acquaintance whose passing cannot be altogether ignored, but with whom we do not wish to hold converse.

It is, we are loth to confess, to the last category that belong most of those excellent injunctions that bid us direct our energies and our thoughts along lines that will bring us a permanent reward. The idea will penetrate to the consciousness of the rare man susceptible to finer influences, but the majority of us erring mortals will not be influenced by it to a measurable degree. We must devise other and perhaps cruder means to bring home to the average man the actual utility of the long-sighted view.

One of the most scandalous abuses of the privilege of democratic government is the pilfering of the public coffers that is carried on, continuously and flagrantly, under the noses of those that keep these coffers full. If an inhabitant of, say, Mars, unaccustomed to the gross selfishness that directs most of our thought and energy, were told how we free and self governing Canadians provide the funds that are, to a large extent, dissipated and wasted without good result, he would doubtless be incredulous. Many Canadians, even, would be astonished if the idea could be hammered into their heads that *they*, not that nebulous entity, the Government, are putting up the money for the sawdust wharves, the pensions that are not deserved, loafing or incompetent public employees, and overpaid railway workers.

What practical expedients can be adopted to bring home this obvious truth to *us*, the tax-payers? Moralizing is worse than useless. There are practical means, and we are gradually adopting them. First and foremost comes direct taxation, avoided just as long as possible because it is distasteful to us as a dose of medicine, and not proposed to us by our political leaders because of their knowledge of this aversion. Now we have the war debt to pay, and must swallow the dose. We know that it will help cure us of our indifference to the waste of public funds, and public resources in general; yet we hate to hand over that small bit of our income direct to the tax collector. It hurts us to do it, but it is good for us to do it.

Another influence in the right direction is the widespread ownership of Government Bonds, which Mr. Fielding seeks to perpetuate by means of his present bond conversion arrangement. It is wonderful what a strong interest the sense of ownership induces. The man who holds even a share or two of an industrial stock follows its progress in the stock market and the fortunes of the company with the utmost interest. Similarly there is induced in the owners of Government Bonds an interest that only the sense of ownership can give. This has been one of the means by which the amazing solidarity of the modern French people has been developed in spite of most potent influences toward disruption. We hope that a similar interest in public affairs and the public finances may be induced by this means in Canada.

EDITORIAL NOTES

The advance of modern metallurgy is well marked in the case of Rossland ores, whose treatment is described in these pages today by Mr. Douglas Lay. A comparatively few years ago, it was predicted that the Rossland ore-deposits were near the end of their tether. The flotation process has changed all that, and we may now confidently expect a further long life for these famous old mines.

Our contributor who suggests the advisability of starting a pottery industry in Canada is on the right track. We are not so confident that his suggestion of Government auspices is sound. We have already the beginnings of a ceramic industry, and potteries can be made to develop naturally from these going concerns.

It is most stimulating to read the reports of the field operations of our Canadian geologists. They are a carefully selected lot of men, and are actuated, almost to a man, by those generous impulses that mark the true man of science and the faithful servant of the public. If the whole of our public services were manned by men of the calibre and with the high ideals of our geologists, we would have little to complain of.

Here is a record, quoted from Lindgren's "Mineral Deposits", "At Hill End, north of Bathurst, New South "Wales, one mass of gold was mined which, with a little "quartz, weighed 630 pounds. It was valued at $60,000. "At the same place 10 tons of ore yielded 5½ tons of "solid gold, valued at $3,300,000."—Hollinger and Dome, attention, please!

It is stated, on good authority, that there are now more than 2,000 firms maintaining research laboratories in the United States. Approximately thirty million dollars were spent in research during the year 1921. Governments, State and Federal, advanced one-third of this. So far we Canadians have failed to establish a single technical research laboratory, modernly equipped on a comprehensive scale. There are a few (all too few) private laboratories working on specific problems, mainly as adjuncts to industrial establishments. We have still to see the vision that has led far-sighted industrial leaders in the United States to invest their millions in research. Our governments have still to glimpse what is now accepted as axiomatic by the political leaders of our neighbors. We wonder if the bookworm that plays havoc with our revered Senate must be referred to United States scientists? Surely we should deal with it here!

THE COMPOSITOR'S COMPLAINT

A Medley

Say, I'm sick!
I'm sick of this here copy, dammit!
The way they feed it in and jam it!
Gimme time to draw a breath,
Gimme liberty or death!
Say, I'm sick!
I'll bet the last bone in my jeans,
That editor gink don't know he ins
About what it means to a guy
To be jammed up with copy then shy
It would'nt be half so damn tough
If we got some near legible stuff,
But them verses! GOOD NIGHT!
Get them out of my sight!
Black curses upon
That blighter VNON!

VNON

Developing a Canadian Pottery Industry

A great many proposals have been advanced recently, suggesting measures to alleviate the unemployment problem. The question to be decided, apparently, is whether or not it would be advisable to continue relief by cash "doles", or if it would be more advisable to endeavour to provide work for the unemployed by promoting certain lines of industry. The writer, after making a very careful study of this question, believes that the unemployment problem could be greatly alleviated by taking one particular industry and developing it on both a technical and commercial scale. At present a great Company is engaged in developing and promoting the woollen industry in Canada, and they have met with assured success.

If it were decided to develop one great industry in Canada to alleviate the unemployment problem, it would be wise to select an industry that had not been developed to a great extent in this country; an industry from which products are produced or manufactured that are in constant great demand; an industry in which men could easily be trained in the various branches of activity.

Range of Pottery Products

A very suitable industry for this purpose would be the Pottery Clay Industry. Pottery includes many varieties of ware made from different kinds of clay. The common flowerpot of the gardener is the simplest kind of pottery made in quantity; and the unglazed pottery of the European and Asiatic peasant, and the Indian pottery, are examples of simple ware, made for every day use, very often from the commonest brick clays. Porcelain, or china, is the other extreme in the ceramic scale, and this class of pottery is made from the finest white-burning kaolin, with which other ingredients are mixed.

There are several types of pottery between these extremes, but in a general way they can be grouped into two classes—those that have a vitrified or non-absorbent body, and those having a soft body that is more or less porous. The latter require to be covered with a glaze or enamel, in order to render them watertight, but vessels of the first type may be left unglazed and still hold water. Modern pottery, however, is nearly always finished with a glaze or enamel, whether the body is porous or vitreous.

Articles for domestic use, like crocks, mixing bowls, jugs, teapots, etc., are generally made from stoneware clay. The heavier kind of tableware, known by various trade names as white earthenware, ironstone china, and white granteware, are made from mixtures of white burning clay and finely ground quartz and feldspar, burned to a fairly dense but porous body and covered with coloured glazes. There is a great variety of pottery made from natural impure clays, which burn to colours ranging from light buff to deep red.

Materials for Pottery Manufacture

Potter's clays are generally regarded as any clayey material suitable for the manufacture of pottery, though the term is mostly understood to exclude those materials that can only be used for the lower grades of ware. Good plasticity and tensile strength in the raw state is essential for making pottery on the potter's wheel, but clays that are short in texture and weak can often be cast in plaster of Paris moulds when they cannot be worked by the plastic process.

The clays commonly utilized as pottery clays are: common brick and tile clays; stoneware clays; ball clay; pipe clay; Kaolin (china clay); and shale clay. The accessory minerals used in the Pottery Industry are: flint or quartz; feldspar; fireclay and sagger clay; gypsum; and the metallic oxides. There are deposits of all these minerals in Canada.

Canada's Clay Deposits

There have not been any elaborate investigations of the clay deposits in Canada, but, as far as is known, there are deposits of the various clays throughout the Provinces. In some cases there is only one known deposit of a particular clay. For instance, the only white Kaolin so far found in Canada occurs at St. Remi d'Amherst, near Huberdeau, in Argenteuil County, Quebec. Great quantities of expensive chinaware (the product of Kaolin) are imported into Canada every year.

According to data so far available, Southern Saskatchewan is the only region in Canada where valuable pottery clays occur in abundance. However, there can be little doubt that if extensive investigations were carried on the result would be the location of a great number of deposits that now are unknown. Canada covers vast areas, and undoubtedly there are clays of every description throughout the country awaiting development.

The common kinds of tableware have hitherto been made so cheaply and so well in European countries that it was impossible for a firm in Canada to compete with them. In recent years, however, the prices for these goods have increased fourfold, so that there is now a much better opportunity for manufacturing them in Canada at a reasonable profit.

The manufacture of staple lines would be the safest kind of business to undertake at the start. These include: (1) plain white, or as it is commonly known, white graniteware; (2) gilt wares, light and heavy, these being simply decorated over the glaze with a gold line, or with a stamped device in gold, the most common on the market being the clover leaf; (the Canadian manufacturer could stamp his ware with a gold maple leaf or a beaver); (3) ware decorated with a transfer pattern in one colour, generally called printed ware; (4) water jugs, either plain white, or decorated with gilt band or printed decoration.

There is an enormous quantity of these goods sold annually in Canada, and any manufacturer producing them at, say, twenty per cent. less than the imported wares would be assured of the greater part of, if not all, the business.

The opportunities in the Pottery Industry in Canada appear to be great. There can be no doubt but that we have the resources, but capital is required to inaugurate investigational activities, as a preliminary to the development of the industry. During the time necessary to carry out the necessary investigation, a number of returned soldiers could be trained in the handicraft and commercial end of the industry. This might open an avenue to extend the vocational training of the Department of Soldiers' Civil Re-establishment.

The great obstacle to this scheme would be the securing of the capital necessary to put the industry on its feet. Possibly a Government loan might be made, as in the case of the soldiers' land grants. Irrespective of the source of capital, if it could be secured it would surely be used to advantage in developing the Pottery Industry. It would absorb a great number of the unemployed, and would place them in an occupation that could be promoted to the position of one of Canada's foremost industries.

G. W. R.

A New Colliery

No. 26 COLLIERY, GLACE BAY, NOVA SCOTIA

By JOHN MOFFATT

No. 26 colliery, Glace Bay, which when fully equipped will rival No. 2, the largest of all Canadian collieries, may be said to have been formally opened during the first week of August. This colliery is simply an extension of No. 1, taking in the lower workings and opening up seaward. It has been placed as near as possible to the seashore to win the under-sea coal. The coal shaft is not finished and a number of the large buildings on the surface are yet to be constructed. When ready, the mine will have a capacity of three thousand tons per day, so that within a half-mile of one another will be the two large coal mines, as No. 2 and 26 are sister collieries.

New Circular Shaft

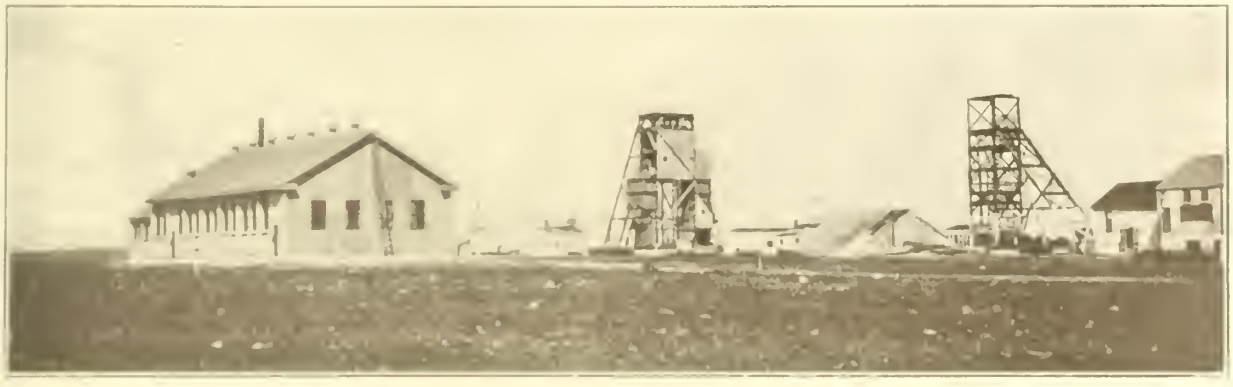
The men and material shaft was begun during the war but sinking went on slowly for a long time. Finally it was completed and is now being used by the workmen of No. 1 in going to and from their work. The shaft is circular, being the first of its kind in Nova Scotia. It is 672 feet deep and 12 ft. in diameter. The upper part is lined with brick, the lower part being of concrete. There are two cages that carry twelve men each. These move on steel guides. The pit bottom will be lighted with electricity. The surface yards are level, and though sixty feet above the cliffs, the salt spray in times of storm will be carried over the buildings. It is a beautiful, but a very exposed site for a colliery.

The new mine cuts off a walk of three miles underground. Employees' trains have been put on to carry the men to and from work and while the main haulage ways are roads below ground, riding trains will carry them to their own sections. It will be remembered that bond complaint was made before the recent Conciliation Boards about long walks underground. No. 1 colliery was among the worst. This removes the cause of complaint.

Electric Lamps for Miners

With the introduction of electric power to the mine, the Edison electric lamp came into use. This is an added joy to the workmen and it is only those who have long had to use the oil safety lamps, who can fully appreciate what this light means to a miner. Light always fills the soul with gladness and as the most of the different collieries have recently received the electric light for one whole day at least daylight filled the dark chambers of the mine. The day had come when those who sit in darkness saw a great light. And indeed those shadows had hidden from many of them the lurking spectre of death, which, if it could not be removed, then on being seen could be better avoided. Even the pit horses with their old blind eyes were dazzled with the bright lights flitting like new suns through the dense darkness of their underground home.

It has been a matter of discussion among mining men as to whether a long walk really affects outputs, and comparisons of collieries have been made with little in favour of those where miners had only a short distance to travel. It is not open to doubt that a walk of three miles against a grade, however slight, takes away from a man's strength, and that when weary and worn with hard toil, his normal working force is gradually reduced. And there is little doubt that men entering the mine and being carried to their place of work, reaching it by 7 a.m., will do better and more work than those who arrive at 8 or 9 a.m. after a long journey. The experiment at No. 26 will be watched with interest as the question is now a live one.



No. 26 Mine, O'Neill's Point, Glace Bay, Nova Scotia
General View of Mine Buildings and Shafts

Connecting two Mines

Whether right or wrong in their opinion, the miners of Nova Scotia have long believed that two separate collieries should not be connected under ground. This belief no doubt arises from the fact that many lives have been lost when an explosion occurring in one colliery broke through into the other. Springhill mines Nos. 1 and 2, or as they were better known at that time, East and West slopes, is a standing example, justifying this belief. On the other hand men have escaped death from after damp in the Pictou collieries because openings had been made from one colliery to another. On the contrary the practice of connecting collieries is common and has been found to be of great practical benefit to the coal industry. There are dangers, however, in connecting the under ground works of two large collieries. Having found it necessary to connect Nos. 1 and 2, which are on the same seam, the Dominion Coal Company made an opening through the barrier pillar, which is 400 ft. thick. This opening is only 6 ft. wide and is protected by two double three ton specially constructed steel doors. They are set in reinforced concrete, with a space between doors of fifteen feet. The thickness of the concrete on the floor, roof and sides is four feet, reinforced by four hundred pieces of steel rail or other similar material. It is not conceivable that the force of any explosion, however great, could break its way through these doors, especially when [illegible]

bered that many openings exist quite near through which the strength of an explosion would be dissipated. The Dominion Coal Company are taking no chances with either fire or flood or gas explosions, and are so arranging the underground working that they are protected against all known dangers.

Bath House

The new bath house at No. 26 colliery is a model one and, compared with some of the first erected by the Dominion Coal Company, is palatial. It is a commodious building and is intended to accommodate 600 men. At present there are only three hundred and fifty miners using it.

The introduction of wash houses in Nova Scotia has been a slow process and it has taken the miners of the province a long time to become accustomed to their use. It is doubtful yet whether the number using these wash or bath houses reaches seventy-five per cent. of the workmen. Only a short time ago it was calculated that the number did not exceed sixty per cent. There may be, and are, no doubt, good reasons for the tardiness of some workmen in using what is considered by many as a great boon.

One has not far to look back to the day when bath houses at the collieries were unknown. Such a luxury was not even dreamt of by the early miners, and when wash houses were first built workmen were generally slow to use them. The first was in most cases a rough, dirty, ill-kept wooden shack-like building, repulsive looking both within and without. Being steam heated, badly lighted, and ill ventilated with water-logged floors and stagnant water lodging underneath, the stench was often unbearable. Added to this, the early buildings were only supplied with wash basins and probably one or two bath tubs for all the men of a coal mine. It is not hard, then, to understand why workmen who lived in good homes and enjoyed pleasant surroundings were loth to go near one of these, much less use them. The more suspicious of the men looked upon them as an innovation tending to interfere with the customs and habits of their domestic life. The very fact that one had to leave his street clothes so far away from home was in itself considered a risky thing and liable to lead to loss by theft or to gain by a "breed not of noble blood." There was considerable foundation for their suspicions, and it is probably due to the experiences of those days that wash houses have not grown in favour more rapidly with workmen. But the modern houses are built for cleanliness, comfort and convenience. They are inspected every day and are under the charge of a caretaker and may now be used by the most fastidious. Since the return of the overseas soldiers, larger numbers of men are using the wash houses.

The No. 26 bath house (it has now passed away from the wash-house stage) is most attractive from the outside and is comfortable, commodious and hygenic within. It is conveniently close to the mine mouth, so that workmen in winter weather will be protected from the cold.

The lamp house is simply an extension of the bath house and here the miner gets his lamp without leaving the cover of the building. The powder house, which according to law must be a prescribed distance from the mouth of the slope or shaft, is placed as near to the wash house as possible to make it convenient for the workmen. Indeed everything was done in locating the bath house site for the convenience, the comfort and the protection of the miner, all humane considerations in themselves even in these much declaimed days of capitalism.

Design of Bath House

The design of the bath house is concrete foundation and concrete floors, with hollow walls to prevent condensation of moisture and to aid in heating. There are seven Bert ventilators in the roof. These are of the best type. The building is 100 ft. by 40 ft., the lamp house being 48 ft. by 28 ft. The floor is of concrete, sloping toward trenches designed to carry off all surplus water, whether it be from the showers or from the washing of floors and walls. The work of keeping the building clean has been made easy by the use of hangers instead of lockers. The windows are set high up and flood the building with light and sunshine, making it pleasant and cheerful, rendering it free from disease germs, which cannot live and thrive under the glare of pure sunlight. It is electrically lighted by night.

Steam heat supplied from a boiler contained within the building keeps it warm, wall radiators being used. Hot water at a maximum of 110 degrees is supplied from a large tank through which coils of steam pipe pass. The system is connected up as in an ordinary bath room with cold and warm water.

In the centre of the building stands a long row of double shower baths. These baths are large and there is ample space to enjoy the showers. Just outside are long rows of settees where men can rest or dress. On either side of the showers are large wash basins with head showers. Sanitary drinking fountains are provided. An up-to-date first-aid station occupies a well ventilated part of the building and in a suitable place are the toilets with proper ventilation and light.

Hangars for Clothes

The hanger for clothes has come into popular use in this Province as in all other countries where bath houses are used. Besides conserving space and keeping down first costs, they have been found to be more sanitary and easier to ventilate than lockers. These latter, because of being closed in and locked up sometimes fill up with old, worn-out clothes which give off vile odours, harbour vermin and breed disease. The hangers, by means of cord fastened to steel hooks, raise the clothes high in the open space overhead, which permits the sunshine and air to pass through. This is as near to outdoor treatment as can safely be given, while protecting them from the weather. This building has nearly all the conveniences of a modern hotel in the way of baths, and has a separate sewer system of its own.

OIL SHALE EXPERIMENT

Commonwealth Oil Corporation.—Mr. John Fell's experiment with burning the shale at the mine has not proved altogether satisfactory, but Mr. Fell is convinced that the process has been proved practicable, the quality of the oil and benzine recovered not being lowered. The directors have therefore decided to continue the experiment, holding that, should it result favourably, it will completely revolutionise the system of extracting oil from shale, and be of immense value to the industry by reducing the cost of production to a nominal sum, which would place the company in a strong position to meet competition.—Industrial Australian and Mining Standard.—

The Southern Rhodesian gold output for June 1922 amounted to 55,614 ounces as compared with 53,920 ounces for May 1922 and 49,466 ounces for June 1921.

Bureau of Standards for Feldspar

Speech Delivered by R. F. Segsworth Esq., at a Dinner given by the Corporation of the City of Kingston, Ont., to the American Ceramic Society, August 17, 1922.

Mr. Chairman and Gentlemen—

The occasion that brings us together tonight is a notable one—the first official visit of the American Ceramic Society to Canada. I need add nothing in the way of welcome to our guests, beyond stating my opinion that in every sense the Ceramic Society is well and capably represented by the hand-picked delegates whom we now have the honour of entertaining.

What I wish to speak about very briefly tonight is the relation that should subsist between a branch of the mineral industry, a branch vitally important to the manufacture of ceramics, the City of Kingston and Queen's University. In touching on this subject I am unable to avoid references to matters in which I am materially interested. This, I am sure, will be forgiven and overlooked, as what I have to say really concerns every actual and possible shipper of feldspar in the Dominion. But [illegible] I speak more particularly for the district that has placed Canada on the feldspar map, a district from which more than three-quarters of all Canadian shipments have come, a district that has produced feldspar that has been taken as the standard of chemical purity and physical suitability. I speak for what is known as the Verona district.

For about a quarter of a century feldspar has been mined in a desultory fashion in this district. Only one large and regular producer has been developed. I shall not dwell upon the obvious reasons for this condition. I shall do little more than mention them.

First, the lack of good roads and reliable railway service.

Second, the ramifications of the market and its very uncertain character.

Third, the absence of any understanding between producers and consumers as to what constitutes good feldspar, or prior [illegible].

Fourth, the lack of [illegible] prospecting in selecting feldspar deposits.

Fifth, the lack of [illegible] capital to enable the producer to carry on over periods of depression and to equip his property so as to be able to mine his spar cheaply.

I do not think that any of these statements can be successfully controverted.

Putting it briefly, the [illegible] of mining feldspar has to-day become secondary and subsidiary. Consequently the economic and the problems of feldspar have heretofore centred on the producer and the whole industry in general and the Verona district in particular have suffered [illegible]. Quite apart from any controversial political [illegible]. And I think it appropriate to mention here the name of Mr. Raymond Ladoo, of the United States Bureau of Mines. Mr. Ladoo's outspoken comment [illegible] and customs that militate against [illegible] industry will do good if they are [illegible] in the spirit in which they are offered.

To resume the thread of my discourse, however, I may say that [illegible] the suggestion was made that there should be established at the School of Mining, Queen's University, a bureau of sampling and standards that should form a connecting link between the producer [illegible] consumer. After due discussion the proposal was approved by the authorities at Queen's. The Provincial Government, however, was not in a position to assume the whole responsibility of such an addition to its organization. It was deemed expedient, therefore, that the assistance of the Dominion Research Council be sought for the explicit purpose of carrying through an industrial and technical research as regards the question of standards and specifications of feldspar.

Accompanied by Professor MacKay, I called on Col. Gaudet, the technical headquarters of the Research Council in Ottawa. We had a sympathetic hearing—but the buck was passed on and would be still passing on, for that is the habit of Ottawa bucks, had we not resolved to face the question in another way. Briefly, with the promised financial aid of Mr. E. W. Beatty, who is not only the President of the C. P. R. but also the Chancellor of Queen's, and that of one or two others, along with the warm co-operation of Principal Taylor and Dean Clarke, it is now practically certain that a Bureau of Standards and Sampling will be established at the School of Mining early in the coming session.

Now while this step is being taken primarily to encourage and protect the producer of feldspar, particularly the small producer, it is perfectly obvious that the consumer in the United States and in Canada will be equally protected. The first object of the Bureau will be to work out standards of quality, ascertainable by chemical and physical tests, that will guide the producer and satisfy the consumer. This may be a very difficult task, but the chief difficulty I am sure will not be anything of a chemical nature; it will be, I fear, that oldest form of original sin, prejudice—the prejudice of the so-called practical man against all things scientific. Prejudice will be overcome only by actual demonstration—not by argument.

The second, and really the main object of the Bureau will be to provide facilities for the control sampling of all shipments made from the Verona district and, if occasion arises, from other districts as well. Logically this will lead to uniformity of grade, and to guaranteed composition of shipments. This will, beyond any question, enormously stimulate production and demand. The railways will benefit, communities will benefit, and Kingston, most of all, as the commercial centre of this part of Ontario will benefit. Queen's University will, to my mind, place herself in a uniquely strong position by acting the part of guide, philosopher and friend to the feldspar industry. It argues enlightenment and public spirit when we see any University so identifying itself with the industrial life of the nation. For myself I may say that it gives me a feeling of respect for this one institution of learning.

I have, I know, taken up enough of your time. Before closing I wish to express my appreciation—as a Kingstonian myself—of the welcome extended by the City of Kingston to the members of the American Ceramic Society. I have the honour to be a member of the Society myself. It is not at all out of place to urge upon [illegible] all Canadian feldspar men becoming Members of the Society. With a strong international membership the Society can be made a powerful instrument for the advancement of our industry and, what is even more important, the promotion of good fellowship.

Concentration of Rossland Ores

FLOTATION SOLVES THE PROBLEM

By DOUGLAS LAY

The following paper on "Concentration of the Gold-Copper Ores of Rossland," was read before the Fourth International Mining Convention at Nelson, B. C., by Douglas Lay, manager of the Le Roi No. 2 Ltd.:

The Ore

From the milling point of view, Rossland ores may be said to consist essentially of small percentages of the mineral chalcopyrite, accompanied by a large excess of the mineral pyrrhotite, in a heavy gangue of altered country, consisting largely of augite porphyrite.

The total combined output of all Rossland mines from 1894 to 1914, a period of 20 years, amounted to 4,655,388 tons, having an average assay of 0.49 ounce gold per ton of 2,000 pounds, 0.6 ounce silver, and 1 per cent. copper.

The total sulphide content of the above would be not less than 20 per cent. With unimportant exceptions, this entire output was shipped direct to local smelters, without the intervention of any milling process; but any investigation along the lines of milling must contemplate the feasibility of treating ore as rich as the foregoing, in addition to the milling ore-reserves proper. The latter present essentially the same milling characteristics and the same relative values of precious metal to copper, and differ only in that the total values are less, ranging from about 0.15 ounce gold per ton and 0.5 per cent copper, upward.

Mine run of ore will, of course, show pieces of pyrrhotite studded with chalcopyrite, in addition to a fine dissemination of mineral throughout the country rock.

The Milling Problem

A milling scheme must therefore deal with a comparatively coarse aggregation, as well as with a fine dissemination of mineral.

Even in the case of ore of as low grade as the last mentioned (0.15 ounce gold, and 0.5 per cent copper), a considerable proportion of the mineral will be freed from gangue by crushing to say 8 mesh, or thereabouts. It must therefore be apparent that while a process of comparatively coarse water concentration will yield a considerable proportion (quite 50 per cent, as will be demonstrated) of the total values, all tailing from such a process must be finely ground in order to free the mineral from the gangue. In other words, it is possible to make a coarse concentrate, but it is impossible to leave a coarse tailing without incurring serious loss. The wisdom of a process of water concentration, in advance of and followed by the application of flotation to the finely ground tailing from water concentration, is clearly indicated.

Former Rossland Milling

The milling history of Rossland is highly interesting, and incidentally of importance as a guide. It may be summarised thus:

The pioneer milling company in the milling field was Le Roi No. 2. In 1903 this company erected an Elmore concentrator of 50 tons daily capacity.

Treatment comprised coarse crushing in Blake crushers, followed by fine crushing to 30 mesh in Chilian mills. The 30-mesh pulp, after classification, were treated on 4 Wilfley tables, and the tailings from these were treated by the Elmore oil process. The results were published in the Engineering and Mining Journal of January, 1905, as follows:

"From October 1, 1903, to September 30, 1904, Wilfley tables treated 11,601 tons feed assaying 0.191 ounces gold, 0.279 ounces silver and 0.522 per cent. copper.

"Wilfley tailing assayed 0.107 ounces gold, 0.227 ounces silver, and 0.394 per cent. copper.

"Wilfley concentrate produced 523 tons assaying 1.77 ounces gold, 1.44 ounces silver, and 1.86 per cent. copper.

"Elmore oil process treated 4578 tons of above Wilfley tailing, producing 137 tons of concentrate assaying 1.129 ounces gold, 3.244 ounces silver, and 6.532 per cent. copper.

"Elmore oil tailings assayed 0.076 ounces gold, 0.135 ounces silver, and 0.206 per cent. copper.

"The Elmore oil process proved a technical, but not a commercial success."

After treatment of the above-mentioned 4578 tons of Wilfley tailing, the Elmore process was abandoned by Le Roi No. 2, but simple concentration was followed by this company for many years, up to the most recent times, its application being, however, limited to the ore sorters' reject after culling out shipping ore, and to low-grade material resulting from development. Shipping constituted by far the major portion of ores mined.

In 1904, the Consolidated White Bear Mining company constructed an Elmore plant of larger dimensions than that of the Le Roi No. 2, the capacity being 100 tons per day. The crushing process comprised crushing by six 5-stamp batteries to 20 mesh, tabling of classified pulp by Wilfley tables, and treatment of Wilfley tailing by the Elmore oil process. No extra data as to results are available, but it is claimed that the savings effected were 80 per cent. of the values. Oil consumption was stated to be about 1½ gallons per ton. The mine closed down after the mill had been in operation for only a short time.

In 1904 the Rossland Power Company constructed a concentrator at Trail, 10 miles distant by train from Rossland, for treatment of ores from the Centre Star and War Eagle mines, the flow sheet contemplating coarse concentration by means of jigs, followed by cyanidation of tailing after fine crushing of the latter in Trent mills. The results were far from satisfactory, and the plant was only in operation for a very brief period.

In 1905 the Le Roi Mining company built an experimental mill of 45 tons daily capacity on their Black Bear property, the process followed comprising crushing by Blakes and rolls, followed by jigging at 8, 16 and 26 millimeters, the tailing from the jigs being crushed in 5-foot Huntingdon mills, classified and tabled on Wilfley tables. The following data of results have been published:

First test—695 tons treated yielded 116 tons of concentrate; saving made, 65.5 per cent. of gold content of ore and 51.4 per cent. of copper content.

Second test—Tonnage not published; concentration ratio 4.5 to 1; saving made, 62 per cent. of gold content, 64.5 per cent. of silver content, and 57.5 per cent. of copper content; tailing was stated to run about 0.3 per cent. copper.

No material tonnage was, however, treated in this mill by the Le Roi Mining company. Just about this date, the lowering of the smelter rates undoubtedly had the effect of discouraging any large scale milling operations.

Flotation Adopted

While extensive milling trials were carried out in this mill over an extended period by the Consolidated Milling and Smelting company, following upon the acquisition of the Rossland properties by this company in 1906 and subsequent years, the idea apparently was relegated to the background, and subsequent to 1905 practically the entire output of the camp was shipped direct to the smelters after sorting. It is significant that the rapid development of flotation process in quite recent years was the means of once again causing operators to seriously consider the question of milling.

The first application of the flotation process to Rossland ores on a really extensive scale is recorded in the annual report of the Consolidated Mining and Smelting company for 1918, when this company erected at their extensive smelting works at Trail, a plant employing Minerals Separation flotation process, capable of treating 1,000 tons of Rossland ore daily. No details of flow sheet or results were, however, published, it being merely stated in their annual report for this year that "headway has been made on the concentrating of low grade ores from Rossland."

The company undertook no lengthy campaign on Rossland ores, and after preliminary runs on the latter, the plant was employed in the treatment of the lead zinc ores from the great Sullivan mine owned by the same company.

Le Roi No. 2, Ltd., was once again the pioneer in installing the latest development in milling practice actually in Rossland, and last year after preliminary tests of their ore by the Minerals Separation Corporation, this company decided to embark upon flotation, the writer being commissioned, among other things, to remodel their existing plant, previously briefly described, and install a Minerals Separation flotation unit. This was done, and close upon 7,000 tons were treated during 1921.

It has been established beyond question that a large proportion of the total gold exists free even in the sulphides, apart from such as exists therein in a state of chemical combination. The existence of gold must therefore be looked for in all three ways, namely, free in the sulphides, in chemical combination in the sulphides and free in the gangue.

Owing to the fact that a considerable proportion of gold exists free in the sulphides, it will be evident that it is possible to make gold recoveries to a very considerable extent independent of sulphide recoveries.

Le Roy No. 2 Concentrator

This is an important point because while the copper sulphide is, of course, valuable as such, pyrrhotite is only worth saving by reason of its auriferous metal content. For a great many years, by a comparatively crude system of tabling, Le Roi No. 2 had demonstrated that it was possible to make a gold saving of 60 per cent., although copper saving was only 20 per cent., and the saving of pyrrhotite could not have then been high, although no data was to hand bearing on that point at the time of considering the application of flotation. In view of the foregoing, it was decided to pass all feed first over Wilfley tables and to send all table tailing after regrinding to flotation.

In the Le Roi No. 2 plant the treatment comprises preliminary coarse crushing in Blake crushers, a primary fine crushing to pass a 10-mesh screen followed by six foot Monadnock mill, and by a primary ball mill, five feet diameter and four feet long. Pulp is classified by a hydraulic classifier, and passed over three Wilfley tables, which yield a pyrrhotite concentrate containing about 1.5 per cent. copper and about one ounce gold per ton. All tailing from these tables, after dewatering, is re-ground in a secondary ball mill of five feet diameter by four feet long, so that not more than 5 per cent. remains on a 60 mesh screen. Again it is classified and passed over one Wilfley table, which yields a pyrrhotite concentrate lower in both gold and copper than that from the primary circuit tables.

Tailing from this table, likewise overflow from the classifier and dewater, pass to a pachuca, where they are thoroughly mixed prior to treatment in a 15-inch, 16-cell Minerals Separation, belt-driven flotation machine. The distinctive feature of the treatment is, of course, tabling in both primary and secondary circuits prior to flotation.

Both Wilfley and flotation concentrates pass in a stream of water to flat-bottom bins, situated immediately over the main concentrate bins, which are on the lowest floor of the mill. After settlement in the flat bottom bins, the concentrate is shoveled into the main bins below, and from the latter it passes to a self-dumping gravity train delivering direct into railway cars on the track about 100 yeards below the mill. It is to be noted that Wilfley and flotation concentrates are not mixed until they have first been settled.

The flotation machine is a 15-inch (diameter of cruciform impellers) sixteen-cell minerals separation machine, of the belt driven type. The original type of thrust bearing was modified by us, ball thrusts being inserted and grease lubrication substituted for oil.

Flotation Oils

Much investigation was carried out to ascertain the cheapest and most satisfactory flotation oils. The following were found most satisfactory, and were finally adopted: Water gas tar, added in the secondary ball mill, at the rate of one pound per ton of ore; heavy pine oil, added in the pachuca at the rate of $\frac{1}{4}$ pound per ton of ore. Further slight additions of the foregoing are made to the middling cells of the flotation machine, but the total quantity of reagents will not exceed $1\frac{1}{2}$ pounds per ton of ore, and the cost was between 7 and 8 cents per ton.

A Complex Ore

Before citing actual figures as to the results achieved it is well to point out that the nature of the Rossland ore is such that an obstacle is placed in the path of really high commercial gold recoveries. It is perfectly true, as has already been mentioned, that free gold values exist to a considerable extent, even in the sulphides. Nevertheless a formidable proportion of the total gold exists in chemical combination in pyrrhotite. Such gold, whether you proceed along the lines of flotation or water concentration is recoverable only along with the sulphide.

The local smelting rate, including freight to smelter, is $6.40 per ton for concentrate. It therefore follows that a concentrate totalling gross values of only $6.40 per ton must be regarded as a worthless product, unless a process of chemical dissolution can follow, and this cannot be considered. A chemical copper concentrate is valuable of itself apart altogether from its combined gold content. A pyrrhotite concentrate, on the other hand, is of itself worthless apart from its combined gold content. Owing to the large excess of pyrrhotite over chalcopyrite in Rossland ores, it is manifest that flotation must follow [illegible]

times otherwise a large proportion of a product, worthless in itself, will be included.

The Results of Flotation

The following data are representative of the actual milling results obtained over an extensive period. The ore in question comprised ore sorters' reject and low grade material resulting from development.

Feed to primary table circuit, gold, 0.155 ounce; copper, 0.42 per cent., and iron, as sulphide, 8.1 per cent.

Feed to flotation machine, (this is Wilfley tailing) gold, 0.074 ounce; copper, 0.30 per cent, and iron, 6.3 per cent.

Wilfley concentrate, gold, 0.93 ounce; copper, 1.40 per cent., and iron, 28.5 per cent.

Flotation concentrate, gold, 0.91 ounce; copper, 4.66 per cent., and iron, 88.5 per cent.

Flotation tailing, gold, 0.043 ounce; copper, 0.10 per cent., and iron, 5.2 per cent.

Costs of concentration: Milling at the rate of 2,500 tons monthly, the following costs were found to result: Cost of delivery to mills, $0.40 per ton; cost of milling, $1.60 per ton.

Pyrrhotite Prevents a Clean Tailing

From what has already been said, it will be clear that the pyrrhotite content of Rossland ores is not only an obstacle of itself to a high concentration ratio being obtained and thus causes the original ore to bear a comparatively high proportion of the cost of smelting the resulting concentrate, but also by reason of its combined gold content it prevents a really low gold tailing. Actually, milling results have plainly indicated the wisdom of tabling in advance of flotation. The more pyritic the ore, the greater the possibility of increasing the saving and lowering cost by interposing jigs in advance of tables, not necessarily with a view to making any tailing from them, but simply to avoid slinning mineral already freed from gangue. Jigging at six milimeters would certainly appear sound practice, and would likely more than offset the complication of the flow-sheet thereby introduced. In the case of a small plant, simplicity of flow-sheet is the justification for direct ball milling of ore directly from the crusher.

In the case of such an intensely hard and tough material as Rossland ore, it would appear questionable even in the case of a small plant, if such a practice is really justified, and it would seem much better to interpose rolls between the Blakes and the primary ball mill purely with a view to reducing the high cost of crushing, apart altogether from any purely ore-dressing considerations. In the case of a large plant, undoubtedly, stage crushings must be followed, rolls following Blakes and gyratories, taking ore down to, say, six millimeters, at which size water concentration might well commence, all tailing therefrom passing to primary ball mills.

Heap Roasting to Aid Milling

As to the heap roasting of Rossland ores prior to milling, investigation has led us to a discovery likely to prove of great value. It is, of course, obvious that the high pyrrhotite content of Rossland ores prevents a high concentration ratio, and therefore causes a high smelting cost calculated on the original ton of ore,—a difficulty that at first sight might appear insuperable. There is, however, a way out of this difficulty, which offers great possibilities, and is incidentally of great interest. It is this:

All pyrrhotite, when piled in heaps with limited admission of air, oxides readily, and even spontaneously ignites. It is not necessary to theorize on the results likely to be yielded by flotation applied to heap-roasted Rossland ore, because actual milling results are to hand of the treatment of several hundred tons of such material. The material in question consisted of some hundreds of tons of the more pyritic ore that had accumulated on a dump. The latter when broken open showed very extensive oxidation, individual pieces were clotted together, and it exhibited all the characteristics of heap roasted ore. Copper pyrites, however, did not show much oxidation, this having evidently been mainly confined to pyrrhotite. Treatment of such material in the mill showed a very high flotation extraction of gold as well as copper, the effect of roasting evidently being to free the gold and leave it in a condition readily amenable to flotation.

Actual results of a mill run on this material are as follows: Wilfley tables, feed 0.09 ounce per ton; copper, 0.47 per cent.

Flotation feed, gold, 0.04 ounce; copper, 0.35 per cent.

Flotation tailing gold, 0.01 ounce; copper, 0.13 per cent.

Flotation concentrate, gold, 0.44 ounce; copper, 8.03 per cent.

Wilfley concentrate, gold, 0.82 ounce; copper, 1.94 per cent.

It will be noted that not only was a very high gold extraction made, but also that the lower proportion of iron sulphide rendered it possible to make a higher grade copper flotation concentrate.

There is a class of ore in Rossland consisting almost entirely of heavy sulphides with comparatively low gold values, which it has hitherto been well nigh impossible to treat profitably. In this case it seems highly probable that excellent results will be yielded by roasting to a low percentage of sulphur. Flotation of the roasted mineral should yield not only a floated product of very high grade, but also a clean tailing.

Book Review

BOILER PLANT TESTING.—By David Brownlie, B. Sc.—Price 10s. 6d. net.—Chapman & Hall, Ltd., 11, Hamilton St., London W. C. 2.

We had the pleasure a few weeks ago of reviewing a pamphlet by the same author and on a cognate subject It is appropriate to reiterate our opinion that Mr. Brownlie knows what he writes about and gives incisive and positive expression to his convictions. And nowadays there is ample cause for the advocate of reform in steam engineering to have very strong convictions.

Mr. Brownlie's thesis is, simply, that the standard code for boiler testing in Great Britain, devised by a Committee of the Institution of Civil Engineers about 20 years ago, is cumbrous, complicated, and ineffective. He emphasizes the very patent fact that a new International Code is badly needed, and that in devising this code the chemical engineer must be consulted equally with the mechanical engineer.

In Part I of the volume Mr. Brownlie exposes the fallacies and errors that underlie present methods of boiler plant testing.

In Part II he itemizes his points of criticism and in Part III suggests additions to the proposed International Code. Part IV is a constructive effort to outline a working Code, taking as a basis recent well-conducted tests.

* * *

Mr. Brownlie's book is the direct antithesis of what we habitually expect from John Bull—that conservator of tradition, that egregiously pig-headed and unquestionably successful builder of nations.

A Budget From New York

BY KIRBY THOMAS

American Silver Producers in Luck

All the silver produced by the mines in the United States is now purchased by the Government mint for $1 an ounce, notwithstanding that the price of silver abroad has been recently below 60 cents an ounce and is now slightly over 70 cents an ounce. This seeming favor to the American silver producers is due to the foresight of one of the Western senators who caused to be inserted in the law authorizing the sale of silver bullion to Great Britain and France passed during the War and as a War measure, a clause which has resulted in supporting the silver mining business materially and without cost to this country or to the American public. These countries required silver for their own money uses and to sustain credits in the Orient and the only available reserve was in Uncle Sam's capacious strong box. About 400,000,000 ounces of silver was sold to the Allies at $1 an ounce, on credit, of course. Senator Pittman of Nevada, seeing a chance to favor and protect the mining interests, caused to be enacted by Congress a provision that when the United States replenished its silver reserve, it should do so at the price of $1 an ounce, the same as was paid by the Allies. At the time and for a few months after the War silver had been selling for more than this price, but for many years before the War the price had been much less—from 56 cents to 70 cents an ounce. About half the reserve has been replaced from the American mines so far, and in the meantime the countries that purchased the silver have made substantial payments. The result has been a very great advantage for the American mine operators, which has been much needed because of the generally low prices for the other metals except gold, which have prevailed now for more than two years, and the high costs of operating. Meanwhile the American users of silver in the arts and industries have been able to purchase silver produced outside the country at the prevailing world market rate.

Oil From Shale

The government geologists, after making careful investigations, assert that the practical exhaustion of the domestic oil fields is a matter of but 15 to 20 years only. At the same time they announce that the great beds of shale in Colorado and elsewhere in the West and also in some Eastern localities can be made to yield upwards of a barrel of oil to the ton of shale and that there exist actually many billions of tons of these oil shales. The alarm of the near exhaustion of oil seems to be fully allayed by the exploitation of the oil shale deposits. So far realization of the possibilities of the oil shale deposits has not been commercially undertaken in any large scale in the United States and those of the opinion express the belief that oil cannot be produced in this country from the shale at a cost to equal the normal average price of natural oil.

The production of oil from shale in Scotland has been a profitable business for more than fifty years continuously and records a $30,000,000 output of the Scotch Companies that operate. It is admitted that commercial and operating conditions affecting the Scotch operations are somewhat different and in some respects more favorable than those confronting the industry in the United States, particularly as regards market price for the oil products and the by-products, but generally the Scotch shales are not so rich in oil nor are they so cheaply mined.

The establishment on a firm basis for large development of the oil shale industry in the United States depends partly upon the assurance of fairly high average prices for oil, due to diminishing supply and world-wide demands, but chiefly upon the perfection of the somewhat complicated apparatus and equipment to make possible cheaper operations and to increase the quantity and value of the products from the shale. Already there is one commercial shale plant operating at Elko, Nevada and it is certain that others will soon be installed in Colorado and in Kentucky and Tennessee.

Recent attempts to treat the oil shale in pilot operations have been successful and have demonstrated that the methods of treating oil shale used in Scotland are not entirely applicable to American conditions. However, the difficulties which now exist are mainly technical and they surely will be overcome through the combined efforts of the large number of engineers and practical men now seriously engaged in the investigation of the problems of treating oil shale.

It is probable that extensive and successful oil shale operations will be undertaken in this country long before the supply of natural oil is exhausted and that the large and increasing needs for oil and oil products can be fully supplied from the oil shale at prices reasonably approximating those which have in recent years prevailed, under conditions of dependence on the natural oil supply, and with a good and dependable profit for the oil shale operators.

Realizing the Super-Power Project Plans

The project for the unification of the power resources of the Atlantic seaboard region from Boston to Washington, which formed the basis of the exhaustive and monumental report of a special Government commission last year, is taking on definite shape.

Now that ample time has been given to obtain the reactions of the electrical industry to the super power report, the members of the advisory board of the super power survey are to be called together in the near future for further discussion of the project.

Mr. George Otis Smith, director of the U. S. Geological Survey, under whose direction the super power report was prepared, believes that the showing of economies presented in the report has stimulated interconnection between existing systems throughout the country. The nation-wide interest that has been taken in the report is indicated by the fact that the entire edition of 10,000 copies has been exhausted. Thousands of inquiries have been received in regard to various phases of the problems involved and a large amount of discussion has been created in technical societies and the technical press.

The report has furnished essential basic data for other large power developments in other parts of the country, notably in the northwest, where the ambitious plans to harness the Colorado river have been officially sanctioned by a Government commission at the head of which was Mr. Herbert Hoover. Mr. W. S. Murray, the technical director of the super-power survey, has been engaged on similar investigations for the Province of Ontario, radial power project, and the Canadian railroads are reported to be considering gigantic government developments on the lines of the plans of the super-power project. Pittsburgh, Chicago and other American industrial centres are seeking to have the Government extend the investigations to their localities.

It has estimated that the super-power project will save more than $300,000,000 yearly in the New England-Atlantic district power users, it realized.

News and Comments

BY ALEXANDER GRAY

Industrial Disputes Travesty

When the Premier was dictating a message to Railway and Coal owners proclaiming that the Industrial Disputes Act must be held inviolate and that employees must be retained at prevailing wage schedules, regardless of all else, the miners of the Maritime Provinces, at the behest of the United Mine Workers of America, were repudiating agreements — so many "scraps of paper". It was almost ludicrous to have the edict from Ottawa after the miners had agreed to return to work — and then quit. The Eastern coal industry was tied in a knot, — but the Premier decreed that those who preferred voluntary idleness are entitled to back pay! Red tape, therefore, was ineffectual where coal production is an urgent necessity and men would rather flout the law and the sanctity of mutual stipulations. The men obeyed orders (the law is a h'ass, in their reckoning, when it is not according to their purposes). Operators are in a quandary as to where they get off or on. They cannot mine and market coal on the old basis. Conciliation Boards repeatedly have arrived at solutions, as repeatedly the men violated their obligations. Yet the men prate about unemployment, their uncertainty of tenure on the payroll and the iniquities of employers. Somehow it seems as though Ottawa had better avail itself of the Washington experience when President Harding was given to understand that interference is provocative of double trouble.

Diamond-Drilling The Vogue

From Newfoundland to Portland Canal, via the Pas, the diamond drill is puncturing the route to mineral developments. Drilling concerns have all they can do and more than they can undertake. At Sudbury, a contract for 5,000 feet near Levack is being financed by interests eager to gain a foot-hold in the Nickel Industry, the American Horse Shoe Company, it is understood, being the chief factor, with a plant recently acquired at Welland, where it is said the ore will be treated for American Horse Shoe Company purposes. The Tonopah Belmont people are sinking on the Herrick at Shining Tree, which was tested by diamond drill —at an alleged cost of $10 per foot. Messrs Carper — of Virginia and Pongola — and Carlisle know something. Of course the Tonopah technical chiefs swallowed that $10 item with a large grain of salt. Elsewhere in the Shining-Tree the drill is busy. At Kirkland Lake more drilling is contemplated. The McIntyre Company will put down two-inch holes, — seeking a core that will mean more than usual. At the same time, it is said the McIntyre will make four holes in the Schumacher Veteran Claim adjoining the Dome. In all of this the Longyear, Smith & Travers and Sudbury Diamond Drilling Company are sharing, their only regret being that they cannot accomodate all their patrons. They have first hand knowledge of the extent of these determinations, and they have the proof that the funds are available.

A Reversal in Exchange

As the premium upon New York funds no longer obtains, and exchange has no particular charms, Canadian banks are imposing a collection charge. Technically, therefore, New York funds are at a discount, which is a decided innovation and not unwelcome, after a long term of servitude that was both irksome and expensive. So, if Canadian currency or its equivalent is not tendered, American currency or its equivalent, less a nominal cost for collection, is the best obtainable. Anyhow, Canadian money is 100 per cent. good throughout the North American continent, — and that may mean Zero Hour when the restored equilibrium promotes fiscal fellowship. Without that tidy little arbitrage business in exchange, of course banks feel they have to exact a trifle of seignorage, as it were. Stamp taxes, and other taxes, the general overhead, make it incumbent upon the banker to cover himself. On the other hand, "payable in New York Funds" has lost its velvety touch. Settlements in general trade are relieved of penalty, but even the nominal charge levied for collections can be quite an item where large amounts are involved. Notwithstanding all of which, the restoration of parity of exchange is indicative of sounder commercial relationships.

Looking for More "Domes".

The rock hounds have been unleashed. Extensions of known ore-bearing structures are the objectives being sought. East and West from the Hollinger-McIntyre section, the quest proceeds apace. Dome Mines having profitably educated their owners, the Schumacher Veteran is to be tested to ascertain whether it is another Dome Extension. The same is true of the Foley-O'Brien. Preston East Dome is advanced as a possibility, on account of its shearing. To the west and southwest there is accumulating evidence that other shear zones have been misunderstood. If it took a decade to define The Dome, it is not at all surprising that the Domelets have halted or been subordinated by what was going on eslewhere. Recent developments certainly have enlarged the understanding of Southern Tisdale and Deloro shear zones, where porphyry is an antidote for ankerite, — and values compensatory for structural vagaries.

An "Artist on the Spot".

Provincial Geologist Cyril W. Knight is a prosy person when it comes to petrological affairs, but he can display the artistic temperament when called upon to express his scientific judgment upon freak depositions. He was delegated as a combined War Correspondent and "Artist On the Spot" to Report on the Sudbury District Anthraxolite,— and what he did not do to that "Anthracite" with a quartz mixture that meant 36 per cent. ash (which the high carbon content could not overcome for any economic purpose), would be unkind to emphasize. Were it not for the quartz; were there a seam and a considerable area of this Anthraxolite; were the Anthraxolite otherwise than what it is, then it would be an ideal Anthracite. Mr. Knight may have overestimated or underestimated the tonnage of Anthraxolite possible in the indicated area. He places the elastic limit at about 2,000 tons, and he did not state whether this included the quartz content. Undoubtedly a few hundred or thousand acres of Anthraxolite without impurities, — high in fixed carbon and low in ash, would silence for all time those who hold that Canada contains nothing out of the ordinary.

Shipments of coal from Lake ports to Canada have decreased more sharply than those to American destinations. Of the total dumped, only 11.7 per cent. went to Canadian ports as against 28.5 per cent. in 1920.

News of Mining

Great Britain

The number of unemployed workers connected with coal mining in Great Britain was estimated at 85,564 on May 22. This compares favourably with 92,170 on April 24.

The exports of British coal to France during the first six months of this year totalled 6,616,992 tons; to Germany the exports for the same period were 2,822,655 tons.

The amount of ammonia produced in Great Britain during 1921, expressed in terms of ammonium sulphate, was 253,253 tons. More than half of this, or 150,228 tons, was derived from gas works, and 56,427 tons from coke ovens. From oil shales the tonnage was 35,146 tons, all of which came from Scotland.

In answer to criticism of the Mines Department, Mr. Bridgeman, Secretary of Mines, pointed out that in coal mining the rate of deaths per million tons raised had fallen from 7.42 for the decade ending in 1882, to 1.60 in 1920. He stated that in that year 33 per cent. of the fatal accidents could and should have been prevented by the men and 8.43 per cent. similarly prevented by the managements. He urged strongly that "safety first" teaching be introduced into schools and colleges.

United States

The United States Bureau of the Census has published complete statistics concerning the mines and quarries of the republic. Although these figures were collected as for the year 1919, their collection has been but recently completed. Amongst other interesting facts we learn that during the year 1919, 94,876 persons were employed in gold, silver, copper, lead and zinc mining enterprises. There were 2,142 working mines, of which one quarter were unproductive. 7,285 of the employees were in receipt of salaries, totalling $16,572,917. Wages amounted to $128,466,888. Supplies and materials for the year cost $69,557,270. The value of products was $325,048,329, of which copper represents 58%. For about one-half of the average number of workers the prevailing hours of labour were 54 to 62 hours per week. The amount of power used aggregated 938,444 h.p., of which copper industries took more than half. One striking feature is the increase from 7.1 h.p. in 1909 to 11.4 h.p. in 1919 for each wage-earner employed.

The withdrawal of appropriations to enable the United States Bureau of Mines to conduct research and industrial earnings of the non-metallic mining industries has aroused a storm of protest amongst operators. It is pointed out that the non-metallic industries are represented by a very large number of small independent producers and that these are far more in need of assistance than are the large organizations that control so preponderatingly the metal mining industries.

For the week ending July 22nd the United States Bureau of the Mint purchased 500,000 ounces of silver, bringing the total purchases made under the Pittman Act to 121,648,501 ounces.

Final official returns of gold production in the Cripple Creek gold district, Teller County, Colorado, show that the total for 1920 was $1,325,988, as compared with $3,887,816 for the year 1919.

The Bureau of the Census states that of power used by metal mining in the United States, nearly three-fifths of the horse-power is generated in prime movers. Of this class of power, 54.6 per cent. is in reciprocating steam engines, 28.3 per cent. in steam turbines, 12.7 per cent. in internal combustion engines, and only 4.5 per cent. in water wheels and turbines, generating a total of 579,282 horsepower. Electric motors generate 603,815 horsepower.

According to the annual report of the United States Geological Survey the stocks of fluorspar held by users on January 1st, 1921, were the largest ever recorded. The shipments during the year were less in tonnage than those of any year since 1908. The average price per ton f.o.b. shipping points was $20.71, less by $4.55 than the price obtaining during 1920. Highest averages were reported from Illinois, lowest from Colorado. 41.57 per cent. of all production came from Illinois, 40.84 per cent. from Kentucky. The average price of ground 'spar was $40.00 per ton; of lump 'spar $21.34; and of ground 'spar $61.11. The total production was 34,960 tons, of which 25,282 tons was ground fluorspar, 3,779 tons lump, and 5,898 tons ground. The bulk of the imported 'spar came from Canada. Imports totalled 6,229 tons, of which Canada contributed 4,370 tons. 1,644 tons came from England, and 215 tons from Germany.

The average price of lead during 1921 was 4.5 cents per pound as compared with 8 cents during the year 1920. The total production was 448,589 short tons, of which 398,222 short tons was smelted from domestic ores and base bullion.

Europe

Spanish production of lead during the year 1920 amounted to 175,196 metric tons. This figure was exceeded only by the United States, which in that year produced 440,221 metric tons. Spain's closest competitor was Mexico with 81,200 metric tons.

The Spanish quicksilver market has recently been closely organized and nationalized. Uniformity of prices and terms has thus been secured. Prices are rising. Sales are largely controlled by the Almaden Council, Madrid.

The bringing in of three new wells in the Baku region has been announced by the Soviet Petroleum Department. The largest producer yields 200,000 poods daily. (A pood is 36 pounds.)

For the 12 months ending April 30, 1922, Germany imported 63 tonnes of gold and platinum including scrap, etc., 239.0 tonnes of silver; 1,855 tonnes of aluminum, 62,875 tonnes of lead; 1,920 tonnes of zinc, 207 tonnes nickel, and 6,726 tonnes of copper.

Africa

According to Mr. J. R. Thirlow, in a paper recently read before the Chemical, Metallurgical and Mining Society of South Africa, the amount of osmiridium present in ore mined on the Rand is one ounce in from 4,000 to 15,000 tons. Iridium is the most valuable constituent of the concentrate. Iridium prices, however, have fluctuated so widely as to make computations of value uncertain. The occurrences of the second other metals of the platinum group seem to be localized.

A South African Joint Council of Europeans and Natives has submitted a memorandum to the Mining Industry Board dealing with the status of native labour. The memorandum declares that the Council cannot admit that any classes of jobs should be reserved for Europeans [illegible]. It is recommended that the colour bar be removed, and that

the ratio now existing between the numbers of Europeans and native employees no longer observed. The statement is made that the European is apt to depend upon the "colour bar" for his job and not upon the quality of his own work. It is maintained that natives should be granted full opportunity for competition with whites. Four ministers of the gospel are amongst the signatories of the report.

Australia

The Government of New Zealand early in 1921 entered into a contract for supplies of Welsh coal at £4.5s per ton. The contract recently lapsed. It is now the declared policy of the government hereafter to rely wholly on domestic supplies.

A consolidation of tungsten mines in Northwestern Tasmania has been effected. Eight operating companies have joined to form a consolidated company with a capital of £500,000. A large central concentrating plant will be erected.

The government subsidy to the Mount Morgan Gold Mining Company has been extended for an indefinite period. It amounts to £1,100 per week.

15,541 bags of lead-silver ore and concentrate were recently shipped from Burnie, Tasmania, to Port Pirie, South Australia, for the Broken Hill Associated Smelters. Forty six shippers contributed to make up the lot. The ores ran as high as 103 ounces silver and 73.5 per cent. lead.

Asia

Production of salt and petroleum in China is a government monopoly. Regulations that became effective in 1914 are still in force. A movement is now on foot to induce the Government to throw open large areas for prospecting.

For the month of June the Burma Corporation reports 15,055 tons of ore milled. The product amounted to 9,600 tons of "lead" concentrate. The refinery turned out 3,-281 tons of refined lead and 379, 683 ounces of silver.

The petroleum production of the British Burmah Petroleum and the Rangoon Oil Company, affiliated enterprises, amounted to 70,590 barrels during June.

In an official statement of the Government of the Republic of China, the number of working mines is placed at 1,378. Coal mining is the most important branch of mining. In the Chikili district 5,000,000 tons were produced in 1920; in the Fengtien district 3,300,000 tons. In other districts lesser amounts were raised.

Silver coin and bullion in India, as on June 22, 1922, was estimated at 7,888 lakhs of rupees; gold coin and bullion at 2,431 lakhs of rupees.

TWO NORTHERN ONTARIO AREAS MAPPED

Part VI. of the Thirtieth Annual Report of the Ontario Department of Mines is now in circulation. It contains two reports, *Boston-Skead Gold Area, by A. G. Burrows and P. E. Hopkins,* and *Black River Area, by D. G. H. Wright.* Each of these is accompanied by a geological map.

Boston-Skead Gold Area

The map sheet covers the townships of Pacaud, Catharine and Skead, and parts of Boston and McElroy. Most of the gold discoveries are not far from the Temiskaming and Northern Ontario Railway, though there are some interesting prospects farther off, in Skead township.

The geology of the area shows Keewatin volcanic rocks and Temiskamian(?) sediments of similar great age cut by Algoman granite, the latter causing the formation of the gold deposits. On these rocks were laid the sedimentary Cobalt series of Animikean age. All the older rocks are cut by diabase dykes of Keewenawan age.

Most of the gold-bearing deposits are small veins in or near intrusions of granite, syenite or feldspar-porphyry. Throughout the area the gold is characteristically associated with tellurium, and ore-shoots are rich though small.

Up to the present, development work in the area has failed to disclose ore-bodies sufficiently large to permit of profitable mining. Exploration is being continued, on the strength of the exceedingly rich ore encountered occasionally in small shoots.

An interesting item disclosed in the report is the fact that gold occurs in the iron formation of the area. Here, as elsewhere, it has been demonstrated that the gold is contained in veins and veinlets cutting the iron formation and that the iron formation itself contains none of the precious metal.

The Black River Area

Mr. Wright considers that his report on this area is essentially a reconnaissance, as he covered over 300 square miles in a season, and so could not do detailed mapping throughout. He has delineated the geology of this area and has provided a large amount of definite topographical information, as well as detailed description of a number of the mining prospects.

The Black River area is accessible from the Temiskaming and Northern Ontario Railway, which runs through the western part, and from the Black River (a tributary of the Abitibi), which crosses the central and eastern parts.

The geology of the area is identical with that of the Boston-Skead area; but Keewatin volcanic rocks cover by far the larger part. The gold occurences are, as usual, in the vicinity of intrusions of Algoman granite, syenite or porphyry. In a number of cases tellurium has been found in association with the gold.

Referring to the vicinities of Goodfish Lake and Bourkes, Mr. Wright says: "These two localities are "still promising, and contain many prospects which "require more development before any pronouncement "can be made as to their economic value". With reference to the whole area, he says that there are "few localities where anything more than the most "superficial prospecting has been done. Therefore, the "fact that the area has not a producing mine, has little "or no bearing on its future possibilities; but the fact "that the formations are akin to those of neighbouring "camps already proven, combined with the fact that "there exists a widespread distribution of Algoman "granite, with which the deposition of gold is said to "be associated, augurs well for the future of the area". Advising the prospector, he says that "in proximity to "these acid intrusions, gold should be carefully pros-"pected for, particularly where the greenstones have "been rendered schistose."

A very interesting geological feature determined is the existance of a series of no fewer than 14 successive lava flows in Keewatin times. Bits of information from the field, such as this, are surely, if slowly, giving us the data from which to piece together a picture of this earliest period in geological history.

The Mining Districts

FROM THE JOURNAL'S CORRESPONDENTS

NOVA SCOTIA

THE STORY OF THE STRIKE

The miners of Nova Scotia are writing a pathetic page of history just now and will have ample time to regret it before many days go by. The labor storm long brewing broke at last, and, however long it may rage, it is certain that before peace returns the supercharged atmosphere of the colliery towns will have had time to cool off and all will be in a better frame of mind to get down to business. At present everything is in a state of flux; leaders have lost control of the labor situation and admit it; new leaders have been elected and old ones thrown into the discard. The mob rules and nothing but ruin faces business, the coal mines, and the colliery industry.

Events have moved with startling rapidity since last Sunday. Then the public waited with hopeful expectation the result of the conference between the Coal Company and the Mine Workers. Monday the public press hailed the new agreement reached and approved by both parties as a happy solution of a long drawn out labor dispute. At the same time groups of workmen on the street corners were swearing vengeance on their leaders who had dared to settle on any other basis than the 1921 rate. Monday afternoon a mass meeting of miners repudiated the agreement and forced the leaders to recall the telegrams calling off the strike. Monday at midnight, the strike came into effect and all miners ceased work. Pumpsmen, firemen and others in charge of property and machinery, even the stablemen, were notified to quit work at seven in the morning. Some heads, more sensible than others, left the pumpsmen and other firemen at work, but pressure from pickets and general sentiment forced these few out and the strike was finally proclaimed one hundred per cent. effective.

Intimidation and Threats of Violence

Having tied everything up the policy to keep it so was effectively followed up and the efforts of the striking miners concentrated on the central power stations.

Tuesday night 150 strikers marched on the New Waterford Power Plant which operates the collieries, and intimidated the workmen there. These quit work and a victory was claimed. Next day the power complained to the Dominion Coal Company that the town was without light and water. The Dominion Coal Company stated that the mines were filling up with water and would, in a short time, be flooded. One of the local doctors wired the Government that owing to the want of pure water, an epidemic would be liable to take place. Meantime the colliery officials had succeeded in the boilers to keep up steam long enough to keep the pumps and fans running, or if they failed to do so to get the horses out of the mine. The horses were got out but the pumps and fans were stopped and the mines filled up with water and some gas.

The largest power station is at No. 2 Colliery. Here the pickets concentrated their forces with the determination to shut off all power. By sheer force of intimidation they succeeded, but at the Mayor of Glace Bay charges there was no violence, it is learned the Dominion Coal Company had advised their officials to go about their business quietly and if they were threatened or stopped, to use their own judgment and take no chances. Threats there were, individually and in the mass, and officials were prevented from going in to the plant to help save the same property, and it was only with the aid of the soldiers on Wednesday evening that the last horses were drawn out of No. 2 colliery.

Miners' Officials Notify Loss of Control

On Tuesday morning the Dominion Coal Company was notified by the officers of the United Mine Workers that they had lost control of the workmen and the Company took immediate steps to save their property. Assistance was asked from the Local Government and on Wednesday afternoon 250 armed soldiers took up positions round No. 2 power plant. A number of volunteer workmen had arrived on the train with the soldiers, but so menacing was the mass of miners and so serious the situation that it was decided to send back the workmen and save life at the sacrifice of property. This was done and while from a distance this act may be misunderstood, yet those on the spot who are competent to judge believe the best policy was followed, for it would have been sheer madness to attempt to lead men with an inadequate force, even if armed, into a position which they could not consistently protect. If the mines of Nova Scotia are to be saved there must be sufficient force to guard the lives of all men who offer their services for this purpose. Mayor Morrison of Glace Bay and Mayor Ling of New Waterford both publicly protested against the bringing in of the soldiers on the ground that no violence had occurred and that law and order had been preserved, and that through their efforts they had largely succeeded in maintaining peace. Nero fiddled while Rome burned, and while floods, if not fire, are working destruction in the coal mines and the coal industry, the first citizens of these towns are vainly trying to deceive themselves and the public in general that there is peace where there is none. No greater tragedy has ever occurred in Canadian industry, and it is being conducted with a gallous recklessness that savors of madness and an evil intent to destroy for the mere satisfaction it brings to demoniacal natures.

The Verge of Violence

Thursday morning the regular train from Sydney was held up at the stations and pickets carrying pick handles passed through the passenger cars in search of "scab" labor. This is being repeated day after day, and no one seems to see any appearance of violence in this act. No. 2 Power House is patrolled by pickets, both black and white, some of whom carry clubs.

White officials have been openly threatened by Barbados negroes, the soldiers were stoned and workmen molested and others taken by force from their place at work, yet there is nothing but law and order as the public is told. If ever there was a policy of frightfulness conjured up by an industrial army, that policy is now being actively carried out in the coal mines of Cape Breton and Cumberland Counties. That public opinion will be embittered and inflamed goes without saying, and that labor organization will be met by the determined resistance of a public who are fast awakening to any real

Red revolutionary doctrine is now bearing fruit, and that they are face to face with the "rule or ruin" policy of the party that only a short time ago endorsed the third internationale of Russia.

Baxter's Error of Judgment

We would like to throw the veil of charity over the events that led to the defeat of President Baxter and his ticket. His policy of moderation no doubt led to violent conflict with the Reds and weakened him with the younger element who are usually drawn into the ranks of the extremists. With heroic patience he plodded on against all opposition and was no doubt in a fair way to win his election when, in a moment of weakness, he gave way to an officer less far seeing than himself and permitted himself to be committed to a policy of strike. This sounded his death knell, and two weeks ago the *Canadian Mining Journal* pointed out his great mistake when it stated that "moderate workmen had lost their leader, and rather than follow one who wobbled, they would throw in their lot with the extremists." That they did so with a vengeance is now part of the history of the United Mine Workers. For Robert Baxter the writer still retains great respect. His mistake was one of judgment, and who is not at a loss to know the right thing to do at some critical moment in his career?

A reference to the mass meeting that repudiated the agreement made by the Executive officers and the Dominion Coal Company may still be of interest. The result of the negotiations was doomed from the first—if it failed to carry the 1921 rates. The conference opened on Saturday and continued to midnight Sunday. The strike had been set for the following Tuesday. There was now only one day to work if a satisfactory settlement was not reached. All day Sunday the workmen were busy. Mass meetings were held in the larger centres where resolutions reaffirming the determination to strike were passed. Monday morning two collieries struck work. These workmen were early on the streets, and when the newspaper announced a settlement there were mutterings of hostility.

Miners' Leaders Humiliated

In the afternoon a mass meeting was called and the agreement rejected. The Executive were ordered to recall immediately all telegrams calling off the strike, and to make sure that this was done two of their number were appointed to accompany the officers to the telegraph office and read the telegrams being sent out. The Officers submitted to this humiliation and only a few hours afterwards Secretary McLachlan, at a night meeting held to appoint pickets, advised the men to go on with the strike and he would do all he could to help them, and within twelve hours after the meeting he, with other officers, declared to the Dominion Coal Company that they had lost all control of the miners.

A Page from the Collieries' Log Book

The condition of the collieries at time of writing is as follows:

Situation as Regards Fans, Pumps and Horses, 9.00 a.m. August 17, 1922

No. 1 Colliery.—Fans operating, pumps not operating, horses all out of mine, boilers under steam.

No. 2 Colliery.—Fans not operating, pumps not operating, horses all out of mine, boilers practically all dead.

No. 4 Colliery.—Fans operating, pumps not operating, horses still in mine, boilers under steam.

No. 5 Colliery.—Fans operating, pumps not operating, horses still in mine, boilers under steam.

No. 6 Colliery.—Fans operating, pumps not operating, horses all out of mine, boilers under steam.

No. 9 Colliery.—Fans not operating, pumps not operating, horses all out of mine, boilers—see No. 2.

No. 10 Colliery.—Fans operating, pumps not operating, horses now being taken out, boilers—see No. 5. Mine lost.

No. 11 Colliery.—Fans not operating, pumps not operating, horses all out of mine, boilers under steam.

No. 12 Colliery.—Fans not operating, pumps not operating, horses all out of mine, boilers dead.

No. 14 Colliery.—Fans not operating, pumps not operating, horses all out of mine, boilers none.

No. 15 Colliery.—Fans not operating, pumps not operating, horses none, boilers none.

No. 16 Colliery.—Fans not operating, pumps not operating, horses all out of mine, boilers none.

No. 21 Colliery.—Fans not operating, pumps not operating, horses all out, boilers none.

No. 22 Colliery.—Fans not operating, pumps not operating, horses all out of mine, boilers none.

No. 24 Colliery.—Fans not operating, pumps operating, horses all out of mine, boilers none.

Only sufficient boilers at No. 2 being run to operate an exciter for lighting purposes.

No. 11 boilers and compressors are being operated to supply air for pumping at No. 24.

The horses at Nos. 4 and 5 can be walked out at any time and are in no danger of being lost.

Nos. 12 and 14 collieries are now filled with gas, with the exception of the slopes.

NORTHERN ONTARIO

South Lorrain

The operations of The Mining Corporation of Canada on the Frontier property in South Lorrain, are proceeding satisfactorily. About 150 men are now employed under the supervision of Captain Faney, mine Superintendent of The Mining Corporation's properties at Cobalt. Two shipments of high grade ore have been made to the Cobalt Reduction Company from this property, which have justified the belief that South Lorrain will, in the near future, be one of Northern Ontario's important silver producing areas.

Cobalt

The Nipissing Mining Company's new vein, No. 251, is proving exceptionally rich, the Company is also doing some exploratory work near Peterson Lake.

Nipissing shipments of cobalt-silver residues to the Deloro Smelting and Refining Company continue at the rate of a car per day. The Company is also shipping a car of cobalt residues to Germany.

The Mining Corporation of Canada will continue to ship cobalt-silver residues to Deloro Smelting and Refining Company, and the Coniagas Reduction Company, Thorold, until the cold weather prevents further work.

The McKinley-Darragh-Savage continues to run on mill ore with the probability of an increased tonnage for August.

One of the most interesting recent developments in the Cobalt area, is the strike of high-grade ore in The Genesee Mine, north of the fault which was supported to terminate the high-grade deposits of the central Cobalt

area. The finding of rich silver ore on the 350-foot level of the Genesee opens up possibilities for the district included in Bucke Township, which up to the present has not produced any startling results.

The Dominion Reduction Company continue to treat tailings and are gradually increasing their tonnage as conditions improve, following their long shut-down.

The O'Brien Mine, following the decision of the Privy Council giving them control of the disputed Violet property, have started dewatering operations, and will probably take preliminary steps to collect damages from LaRose Mines, Limited, under the Privy Council decision, awarding the Violet claim to The O'Brien Mine.

Shaft sinking is proceeding on the Colonial mine under the new company controlling the property, the Menago Mines, Limited.

Fort Matachewan

The Coniagas Mines, Limited, Cobalt, have temporarily stopped work on the Brookbank claims, Holmes Township.

This company is energetically testing the Northern Ontario field for gold properties, and will explore the Hull Kipper locations in the Kowkash Mining Division, West of Cochrane.

Gowganda

The Wig Wam Silver Mines, Limited, at Wig Wam Lake in the Gowganda District, have an extremely interesting property. Some very rich silver ore has been taken out in preliminary work, and prospects are bright for another silver producer in this locality.

Porcupine

Reports current in the Porcupine area would indicate that very rich gold ore has been struck in the lower workings of the Dome, so rich, in fact, that hand cobbing is necessary.

Since the beginning of the year the Dome mill heads have averaged from $10.50 to $15.00 per ton, as compared with $9.00 for the Hollinger and $11.00 for the McIntyre.

The Preston East Dome property, owing to its proximity to the Dome Mines, is arousing renewed interest. The deep level developments in this area will undoubtedly produce interesting mine developments.

Kirkland Lake

The Nipissing Mining Company is diamond drilling the Burnside Grove claims adjoining the Tough Oakes.

Work on the Beaucourt property is proceeding satisfactorily. The shaft is nearing the 600 foot mark, and development work [illegible] well under way.

The Vindicator Syndicate is drilling its second hole. The first hole to a depth of 1000 feet showed satisfactory results.

Lake[illegible] River

The [illegible] Gold Mines Ltd. continue to get encouraging results from the development of their property. Several veins have recently been encountered showing [illegible]. Work on the shaft and head frame is proceeding satisfactorily.

A potential source of fuel now running to waste, is the sulphite waste liquor from the manufacture of pulp. It is claimed on good authority that this fuel, if recovered, would [illegible] the pulp and paper mills of Canada [illegible] independent of outside sources of fuel, as well as providing valuable by-products.

BRITISH COLUMBIA

The Portland Canal District

Recent word from Stewart B. C. corroborates the reports of an important strike of high-grade ore having been made on the "Big Missouri" Group, now being developed by A. B. Trites, who with some associates has bonded the property.

George A. Young, government road superintendent, says that good progress is being made in opening up the mining district of Portland Canal. A branch of the Premier Mine road is being built to the Big Missouri, a distance of six miles, and will be in shape for ore haulage this year. The Bear-Naas River trail is being put in good condition. This runs into Meziaden Lake, a distance of 40 miles from Stewart and will facilitate access to many mining prospects.

The Henderson Group of Mineral Claims, situated on the southwest slope of Hudson Bay Mountain, and recently bonded by Capt. J. R. Turner, engineer for the Duthie interests of Seattle, Wn., is showing up well, some high grade galena associated with grey copper having been exposed. A quantity is being sacked ready for shipment. This is reported to assay on the average 500 ounces of silver to the ton besides considerable values in lead and gold.

Slocan Development

The Jack and King George Claims, Lemon Creek, have been bonded by Colorado interests. These are silver-gold properties on which a considerable amount of work has been done, values in the main workings averaging $18 a ton. The Chappelean Mill, three miles below, will be used for the treatment of the ore. The acquisition of the Arlington Silver Mine at Slocan City is being considered by the same people. This adjoins the Ottawa Mine.

The Ruth Hope Mine and concentrating plant, owned by George Alexander and associates of London, Eng., represented by James Anderson, of Kaslo, has been bonded to R. H. Stewart, R. S. Lennie and associates. This deal is regarded as one of the most important mining developments in the Slocan Mining District for months.

The main vein on the Golden Age claims, north of Hall's Siding, near Nelson B. C., has been proved by Terzian Brothers for 5,000 feet, the ore, it is stated, averaging $21 a ton in gold over a width of six feet. The winter will be spent tunnelling on this showing. There are nine claims and they are close to the track of the Great Northern Ry. The owners propose concentrating their energies on proving tonnage and continuity of values.

L. H. Biggar, of the Ottawa Mine, Slocan City, is endeavoring to obtain a lease for the winter on the Tamarac Mine, which recently was worked by Malcolm Cameron, who uncovered a body of good milling ore. The property is convenient to the Ottawa Mill.

About 70 tons of ore a day are being treated at the Ottawa Mill, Slocan City. Results show a concentration of 52 to 1, and a recovery of 75 to 80 per cent. on six-ounce silver ore. The July clean-up of concentrate yielded 13,200 ounces of silver from 2115 tons of ore.

The Gibson Mining Company's surface plant, buildings etc., which were destroyed recently by fire are to be restored immediately and the property soon will be on an operating basis.

A nine foot vein of gold bearing ore is reported to have been opened up on the Bayonne Group and the news has given a fillip to mining throughout the Bayonne Mining District.

Trail Ore Receipts

At the end of July records of ore receipts at the Trail Smelter, Consolidated Mining & Smelting Co., showed that the quarter million mark had been passed. In the last week of the month 10,520 tons were received, bringing the total for the year to that date to 250,023. The week's shipments included 205 tons from the Silversmith, Sandon, and 269 tons from the Standard, Silverton. There were 8,852 tons from company mines. During the first week of August 8,713 tons were received, new independent shippers including Hallett & McKellar, Beaverdell, 16 tons and the Nettie L., Garrard, 20 tons.

China Clay in the Cariboo

Messrs. A. G. Henderson, W. T. Campbell, William Hunt et al, of Vancouver B. C., are planning the exploitation of large deposits of kaolin in the Cariboo. The establishment of a fine pottery and tile industry is proposed. The clay is pure white and government analyses show it to be of excellent quality. A test made at the government laboratory, Ottawa, produced a hard, white, non-absorbent tile which takes good glaze and is pronounced equal to any imported to this country from England. With the addition of feldspar and ball clay, which are to be found in this province in large quantities, a first class china can be manufactured from Cariboo kaolin.

B. C. Spelter for the Far East

Manifests of vessels leaving Vancouver for the Orient and Europe indicate that there has been a marked growth in the movement of spelter through the Port of Vancouver in recent months. At the close of the war it was estimated that there were 20,000 tons of lead and zinc on hand in British Columbia for which there was no foreign market. Japan first and later Europe absorbed this supply and the demand has continued. Nearly every boat leaving for Japan carries a quantity of these metals, exports to that country amounting to about 1,200 tons a month. Europe takes approximately one-third of that amount a month. The production of the Trail smelter runs to about 90 tons of zinc and 150 tons of lead daily.

WIRE ROPE EXHIBIT

Wilkins Wire and Wire Ropes, Limited, Eastwood, North England, are sending out the first wire rope exhibit ever sent from England. It will be an exhibit in Machinery Hall at the Canadian National Exhibition and will include all kinds of flat, hoisting, and mining ropes, together with steel rollers for mining purposes. An interesting feature of the exhibit will be the gold-plated wire ropes used on the Royal Yacht "Victoria and Albert" in 1851. Macaulay Pope, 186 Bay Street, Toronto, is the representative for Eastern Canada for Wilkins Wire and Wire Ropes, Limited.

Final returns show production of all coal in the nineteenth week of the strike as 4,605,000 tons including 29,000 tons of anthracite. In the corresponding week of 1921 the output of bituminous was 7,770,000 tons and of anthracite 1,770,000 tons, a total for all coal raised of 9,540,000 tons; the year before that the total was 12,250,000 tons. Considering anthracite and bituminous coal as a combined source of supply, the present weekly output is over six million tons below normal.

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EDITORIAL

If roguery, misrepresentation and lack of skill were eliminated from mining to the same degree as they are in the operation of railroads, manufactures and other industrial undertakings, we might deal successfully with the element of chance, and reduce speculation to investment.—J. C. Gwillim—1907.

PROSPECTING ON THE GRAND SCALE

To day we print the announcement, from the pen of Mr. Alexander Gray, of a development in Northern Ontario that is of prime importance to the Canadian mining industry. Two outstanding groups of mining men, the Nipissing Mines and the Continental Mines, have undertaken to explore thoroughly the possibilities of an extension of the Kirkland Lake gold bearing zone, and the latter have likewise staked a substantial sum on the possibility of O'Brien silver values continuing into the adjoining Colonial property, which they now own.

These men, leaders in mining finance, have decided to do on the grand scale what every prospector does when he strips his vein. The prospector finds a good "showing", and then (if he knows his business) proceeds to uncover it throughout its length. It has taken many a year to convince the prospector that this irksome pick and shovel work is necessary if he is going to reap the full benefit of his find. The pick and shovel is now an accepted part of the prospector's equipment, and the modern prospector smiles at the "old timer" who depends altogether upon his little pick and a capacity for divination.

There is a distinct analogy between this and the present case. It is essentially the prospector's hope and faith that have led these American mining men to provide a large sum of money to follow up the gold bearing "break" of Kirkland Lake. It is probable that this investment means less to them than does the time and effort spent by the prospector in stripping his vein. They have calculated the chances, as the prospector does, and have concluded that "the game is worth the candle". The move has not been made without a very careful examination of all evidence obtainable on the ground, and the advice of masters in the science of gold mining.

This move is a most important one. For a number of years past the mining men who have thus invested have been searching systematically for a property they considered worth developing. Hundreds of prospects have been examined, and turned down as not up to the standard required. What they sought was a property whose potentialities would, if realized, place it in the front rank. Mineral deposits of such size are rare, so it is not surprising that the search was in vain. Now there has been delineated an area of great promise, and a thorough going attempt will be made, by mining men and with their own money, to establish the feasibility of a mining operation of the first magnitude.

It is quite possible that this move will be made the basis of an attempt by unscrupulous manipulators to institute stock-jobbing operations on a large scale. They will ask why the millionaires should have the best of the Kirkland Lake field, while the small investor is left out in the cold. They will then proceed to acquire a few thousand acres of absolutely worthless ground and thereon build a house of cards in the similitude of Continental Mines, Limited. It is an old game. We hope and trust that in this case the public may become sufficiently well informed to prevent such a deplorable reaction from a development that assuredly will get out of the Kirkland Lake field all there is in it.

HIGH PRICES OF COAL TO REMAIN

It now seems to be assured that all Canada's domestic resources of coal will be available during the coming winter. The 7,000 miners of Alberta and eastern British Columbia have voted by an overwhelming majority to accept the recent offer of the operators. The leaders of the 12,000 miners of Nova Scotia have recommended their acceptance of the agreement negotiated last week, and it is confidently predicted that the vote on August 31st will show that it is approved by a large majority. Meantime the coal mines of Vancouver Island and New Brunswick's one pit are being worked to capacity.

Throughout this period of acute disagreement over wages, it has been obvious that both the operators and the miners of Alberta have been closely allied with the respective organizations across the border. Hence it was a foregone conclusion that when industrial peace was foreshadowed and finally declared in the bituminous coal fields of the United States a similar settlement would be made in Western Canada. In District No. 18, U.M.W.A. as in the United States the compromise effected is mainly in favour of the miners. The time for the reduction in the wages of coal miners, which will assuredly come eventually as must a reduction in the wages of all labour still unduly enhanced, has been postponed indefinitely.

In Nova Scotia the case has been somewhat different. Special conditions, including the old-time agreement of partial non-interference by U.M.W.A. [illegible] local Nova Scotian affairs, postponed the final [illegible]

down". The representatives of the British Empire Steel Corporation made offers to the miners from time to time, which we believe to be as high as the conditions at those various times warranted. When the awards of the two recent arbitration boards were made, there seemed a distinct likelihood of the reduction in the cost of producing coal in the United States, with a consequent all-round reduction in selling price. Since then those hopes have gone glimmering. It is now certain that the wages of miners in the United States will remain at or near the war-time peak for some time to come. There is no doubt that this fact led the British Empire Steel Corporation to make their attractive, though belated, offer to the miners on August 18th and likewise made it possible for them to agree to the similar terms that are now before their miners. The special concession to the miners is the long-term agreement that has been effected. As it is beyond question that the company intend to live up to this agreement, we may take it to mean that in the judgment of these operators, coal prices on this continent are destined to remain at their present high level for an indefinite period.

The terms of settlement of these strikes can afford us comfort for the immediate future; we shall not go without fires or railroad service during the coming winter. But what of the more distant future? Coal is the basis of the world's industrial system, as well as the main source of our artificial light and heat. With this point in mind, British industrial leaders fought to a finish the demands of British miners for what has been determined as more than their fair share of the nation's income. The miners of Britain are now working hard for a living, as are all their fellow-citizens. The British nation judged their case and refused their demands. On this side of the water the issue has not been so clear-cut, and the decision now arrived at savours of temporising. Neither miners nor operators have been fighting on behalf of the public, and the public has not been sufficiently interested to exert its undoubted right to decide the question. Consequently the active disputants, finding that the third party to the dispute is, to all intents and purposes, blind to the issue, have agreed to close the argument, and to make the third party pay. Thus the net result of all this hubbub is that the miners will continue to receive wages out of proportion to the service they render the community, the operators will pass on the bill for this to the public, coal will remain at a high price, and the much-desired deflation in the cost of living will be prevented for we know not how long.

If we need any corroboration of the soundness of these deductions, we need only refer to the recent action of the United States Steel Corporation in increasing the wages of their employees. These wages had been reduced toward the low level it was desired to attain throughout industry. Now this low level seems impossible of attainment, and the Steel Corporation, in mere justice to their employees, have raised their wages once more.

So, as usual, the average citizen will have to foot the bill. Those whose remuneration is now at or near the pre-war level will feel this most. When a sufficient proportion of these average citizens realize clearly that the wages paid to specially privileged classes of labour are paid by themselves, then, and only then, will equality be achieved and justice meted out.

CAUSE AND EFFECT

Of the name and work of Mr. Lloyd W. Parsons, our readers will hardly need reminding. Mr. Parsons attained prominence as a member of the staff of the United States Bureau of Mines. As a writer for the *Saturday Evening Post* he has attracted an unusual amount of attention. His departmental articles, "Everybody's Business", are read throughout the English-speaking world. Mr. Parsons' specialty is fuel. His writings attest his sound grasp of the economies and technology of this all-important subject.

The other day, in an address delivered at the annual dinner of the Canadian Gas Association, Mr. Parsons expressed himself as convinced that gas will be the domestic fuel of the future, and, moreover, the chief source of industrial power. He alluded to the use of raw coal in the most strongly condemnatory terms.

Side by side with the newspaper report of Mr. Parsons' address appeared an announcement to the effect that a New York inventor has developed a method of generating gas from crude oil and dissociated water, and that revolutionary results are to be expected. The report is in typical "journalese." But this and similar announcements show how the wind blows. So far, however, no allusion has been made to the fact that coal itself can be made to yield enough oil to supply all our needs, and yet leave a valuable residual fuel.

As has recently been pointed out in these columns, the efforts of British and Continental techologists are being directed with unexampled intensity to perfecting methods for "carbonizing" lignite and bituminous coals. Success will come. That is inevitable. And success will mean extending the "life" of the world's coal deposits almost indefinitely.

One hardly recognized cause of the mighty recent advance in the science and practice of coal utilization, an unconscious and perhaps a quite unwilling contributor to the progress of nations, is the labour leader. We very much doubt if our knowledge of fuel conservation would be what it now is, had not the leader of labour seen fit to over-use that double-edged weapon, the strike.

The divine law of compensation is as immutable today as it was under the Mosaic dispensation.

ANTHRAXOLITE AGAIN

The press campaign in support of the famous "coal deposits" of Sudbury grows apace. "Canadian Press" has circulated a dispatch from Sudbury to the effect that "A. F. A. Coyne, the Toronto geologist and his gang of experts and miners" have uncovered "a seam of pure anthracite coal with slate above and below." To ensure the

quality of this material, geologist Coyne affirms his intention of sending samples of his anthracite for analysis to the leading universities of the continent. He likewise makes an offer to the Ontario Provincial Government—and through the government no doubt, to the people of Ontario. For the sum of one million dollars, to be guaranteed by the Government, our heroic friend undertakes to produce from the Sudbury district within a twelve month, ten thousand tons of coal. On the basis of such a guarantee, he is sure that practical coal men will advance him the paltry $350,000 required to extract this coal from the bowels of the earth.

What a sporting bet! What a magnanimous offer! If only all our mine promoters would thus come up to the scratch, what a race there would be for our mineral resources!

But wait—let us look at this offer a little more closely. In the first part, what about the quantity of the anthracite, whose quality is to be attested by analyses from our leading universities? We don't find the place where Mr. Coyne mentions the amount of pure anthracite he intends to mine. Mr. Knight did better than this, for he not only estimated the amount of bituminous material in sight, but quoted an analyses of a picked specimen—such as Mr. Coyne would, no doubt, send to the various universities. And how about the quality of the ten thousand tons of coal that is to be mined for the Ontario Government? Not a word. This is strange, considering the insistence upon quality in the first instance—but not so strange, either, when we remember Mr. Knight's description of the "run of mine" material available from the anthraxolite veins. But then the risk that Mr. Coyne is taking in making this offer to the government—surely he is to be commended for this? Let us examine the figures. Ten thousand tons for $350,000—$35 a ton. Why, we might almost have made that bet ourselves for a million dollars stake, even though it would be hard to get ten thousand tons out of those dinkey little veins near Larchwood.

Seriously, it is a pity that "Canadian Press" circulates such stuff and nonsense as this dispatch from Sudbury. In this case it constitutes itself an agent in spreading a report that, though it deceives no one well versed in mining affairs, may mislead many who are less well-informed, with a consequent diminution in their bank accounts.

EDITORIAL NOTES

We are pleased to be able to publish today an appreciation of the late Gardner F. Williams, an octogenarian member of the "Old Guard" of mining engineers who died on August 24th in California. As Mr. Gray aptly points out, it is to such outstanding figures in the mining industry that a large part of its progress is due. That Mr. Williams, an American by birth, became such an important factor in the development of a British dominion, is one of those innumerable incidents that demonstrate beyond question the essential solidarity of the Anglo-Saxon peoples, including the Americans.

We wish to draw attention to the resumé, on another page, of the Standard Specifications for Wire Rope, recently published by the Canadian Engineering Standards Association. The conclusions reached by the committee of practical men who have drawn up this schedule of regulations for the guidance and aid of manufacturers and users, are simple, clear-cut and to the point. The present specification, if applied commercially, will simplify greatly both the manufacture and sale of wire rope, and will tend to protect the user from the use of shoddy material and from misunderstanding of the kind of rope he is using. The voluntary efforts of members of the Canadian Engineering Standards Association, exemplified here, will in the aggregate have a tremendous effect on Canadian engineering practice, both by inducing more economical manufacture and by inculcating rational ideas among users.

There are interesting events astir in the Quebec asbestos field. The attempt of Consolidated Asbestos Corporation to effect an intimate co-operation with buyers on a profit sharing plan may prove a good working substitute for the amalgamation of mining and manufacturing interests.

THE FLESH POTS

"Now this here question's up to you:
What can a bleedin' feller do?
A feller that has made a strike,
A feller that the boys all like?
Start mixin' up with social stuff,
And treatin' all the old gang rough?
Well, pardner, none of that for mine;
I'm still goin' to *feed*, not dine.
I'm going' to stick to draw and stud,
And not this bridge they play for blood.
I'll play the races now and then
(I've got a cheque book and a pen.)
I'll get me one plain motor car,
But I won't travel fast or far.
A decent soot of rooms I'll get,
Where I'll have shelter from the wet.
I'll go to the theayter too,
As often as I want to do.
In fact, as far as I can tell,
I'll live just average good and well
I won't put on no dog or crust,
BUT—once a year I'll have a bust,
A good old fashioned souse like what
I had before I made my pot
Once in a while I want to wear
A shirt that's needin' soap for hair
I want to eat some chewin' plug,
And drink hard licker from a jug
I want to let my chin grow stubble,
And scrap around, and look for trouble

* * *

By cripes! this sounds so good to me
I'll telephone the doctor [illegible]

ANON.

"Big Interests" At Kirkland Lake

SQUARE MILES OF MAIN FRACTURE AREAS TO BE EXPLOITED BY NIPISSING AND CONTINENTAL MINES

By ALEXANDER GRAY

Kirkland Lake's golden two and three-quarter miles may not rival the Comstock's "richest pay streak on earth"; but that portion of Ontario situated north of Cobalt and south east of Porcupine — more east than south — is beginning to boil over. There is every indication that large capitalists now recognize the exceptional merits of these gold fields. If two-and-three-quarter miles are insufficient to make the town of Kirkland Lake another Virginia City, the three more miles now held by the Continental Mines, Limited, with an Ontario charter that has gone unnoticed, and the further extensive areas held by the Nipissing Company, of Cobalt, may be the means whereby these newer Ontario sources of the yellow metal will at least be a greater factor in that metal market.

The reason for the movement toward Kirkland Lake is contained in the producing record of its mines and the carefully-matured judgment of noted mining scientists, who have preliminary proofs of more extensive fracturing and undoubted evidence of the expanse of favorable geological conditions. Moreover, and what substantiates the expectations of those who exact more than samples, there is the concrete result achieved by the silver and gold mines. To date, Ontario has produced 330,000,000 ounces of silver, worth $203,000,000 and approximately 5,250,000 ounces of gold, estimated at $105,000,000. Confirming this is the following from official records as of January 1, 1921

	Ounces	Value
Silver	322,858,563	$198,099,336
Gold	4,276,876	87,797,553
Grand total		$285,896,889

When it is understood that this silver production relates to the period beginning with the discovery of Cobalt in 1903 by Fred. LaRose, McKinley, and Darragh, and that the greater quantity of the gold pertains to the years 1912-21, it becomes more apparent that the cumulative benefits following upon historic discoveries of precious metals accentuate the worth of Ontario's treasure-trove — no longer without ownership, other than that of Mother Earth. The dividends from gold mines, despite the handicaps due to a devastating fire and the War, to the end of 1921 had totalled $23,140,734. That, however, inadequately represents the factor of return for capital, for those mines had to be developed, and equipped out of earnings, and expanded beyond that equipment, while creating ore reserves estimated at approximately $80,000,000. As the silver mines have also distributed about $95,000,000 in dividends and bonuses, manifestly the combined precious metal output of Ontario since LaRose started the Messrs. Timmins, McMartin and Dunlap on their iridescent careers as the owners of the LaRose and Hollinger, and since Wilson and Edwards made their find at the Dome premises, corroborates the claims of Ontario to preeminence in Canada, if not universally. Ontario alone shows remarkable progressive production.

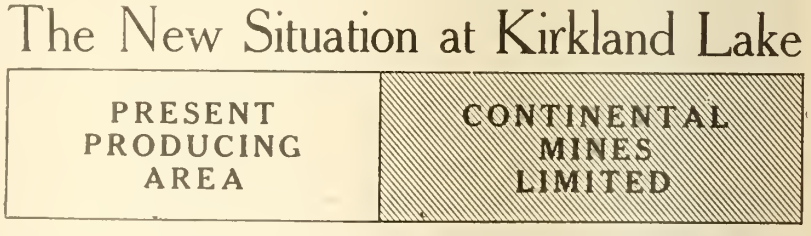
For these reasons, and because phenomenal Cobalt is nearing the finale, "Big Business" seeks Kirkland Lake gold fields and environs. So formidable is the movement based upon increasing knowledge and developments at depth, it is acknowledged that the gold lands of the Ontario northland are the most attractive awaiting the intelligent expenditure of speculative capital.

Hence the advent, with all it commands, of the Nipissing Company of Cobalt — Canada's greatest silver producer — and an impressive, if as yet inconclusive demonstration by the Continental Mines. Both of these mining corporations are of international origin. They have entered the Kirkland Lake with fore-knowledge of what they can expect and the chances they take, prepared to bring prospects to the producing stage when the "pay cracks" justify it.

For nearly twenty years the Nipissing Company has been entrenched at Cobalt. It has tried every new field seeking opportunities for reproductive investments. Nor is it going to "come out of the trenches," as Henry Ford expressed it, until Cobalt has sounded the "last post." There is further Nipissing territory at Cobalt awaiting exploration. Meanwhile the Company will prove what appears to be an extension of the fractured zone, immediately east of a portion of the Kirkland Lake (Tough Oakes) Proprietary ground, at Kirkland Lake.

Where Continental Comes In

At the same time, the Continental Mines not only have taken over a country-side, three miles in lateral extent and three-fifths of a mile transversely ("upon information and belief", as the lawyers put it) where the main fracture has been exposed; but they have acquired the Colonial Silver Mines at Cobalt, about the last of the well-placed central areas in that better-than-$200,000,000 camp.



Continental Mines field forces have been engaged for months in quietly mapping the surface of their square miles. The twenty-seven Kirkland Lake claims, and their two Colonial Silver claims, constitute a large sphere of activity. Under the direction of Mining Engineers of outstanding repute, while producing mines have been winning wealth and confidence, Continental Mines have been striving to locate those geological features and faults that made Kirkland Lake what it is.

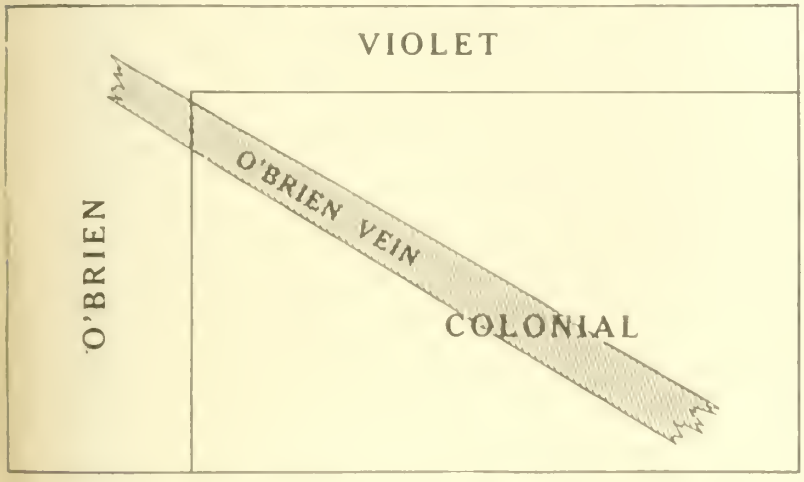
The potentialities of the Colonial Silver Mines are conceded, and will be quickly determined, shaft-sinking now being in progress. The acreage blanketed at Kirkland Lake by Continental Mines has priority in the estimates, in that it is certainly in possession of the fissuring and mineralogy of the producing two-and-three-quarter miles near-by.

Extent and Possibilities of Areas

More than presumptive evidence was necessary to persuade the technical advisers of the Nipissing nad Continental Companies to enter the Kirkland Lake gold fields, and to induce the Continental people to take over the Colonial Silver Mines. Colonial properties have the un-

questioned advantage of position and form, because the O'Brien Mine, one of the most productive, has an excellent ore-body that has been followed to within the width of a boundary pillar of the Colonial line. Kirkland Lake, though, has loomed so large owing to the expanse of gold-bearing rocks, R. B. Watson, on behalf of Nipissing, and R. C. Warriner, acting for Continental Mines, of which he has become President, decided that the facts of the gold fields amply warranted a comprehensive campaign. Mr. Watson is noted for his prudence and capabilities as a mining engineer. Mr. Warriner, originally of Pennsylvania, left an enviable record at the Witwatersrand, where he was Consulting Engineer to Crown Mines—a combination of central Rand properties controlled by the greatest factor in the gold mining world. Mr. Warriner also was General Manager of those properties, and was identified with the best mining practice. His mines hold the world's crushing record of 2,100,000 tons in a twelve month. Mr. Watson has not publicly committed himself to an opinion as to what the Nipissing is apt to have on the south line of break going east from the Tough-Oakes. Mr. Warriner is familiar in more or less detail with what Continental areas have disclosed thus far. The extension

Continental Holdings at Cobalt, Ont.



of the main fracture, in his judgment, traverses Continental claims for a mile at least. He has mapped the favorable faultings, as outlined by Geologist Goodchild of London, and Ontario provincial geologists, and the strength of the porphyries, conglomerate, syenite, lamprophyre and other features distinctive of Kirkland Lake producing section, *prima facie* proof of the potentialities of the New Situation as affecting not only Continental Mines but Nipissing as well. The accompanying sketch in simplest manner illustrates the relationship of what may be designated New Kirkland in distinction to the older, productive Kirkland.

Plans Quietly Perfected

Months ago I intimated that influential interests were overlooking nothing at Kirkland. Those interests understood that the central structures have been decoded, as it were. Preliminaries having attended to, necessary preliminaries, Messrs. Watson and Warriner, among others, started to "dig in." They are not given to confiding plans until they are perfected, and as the representatives of constructive mining capital, they are averse to prophecies until they know—which was Mark Twain's counsel. They think they know something, and the documents are in shape. Without trumpetings, refraining from broadcasting until static conditions were right, they made sure of their ground. Hence the significant transactions and guarded announcement that Continental Mines found the extension of the main fracture and that Nipissing is in the firing line.

Circumstantially, Continental Mines provided the more interesting development, having its beginning in the acquisition of the Colonial Silver Mines by the Menago Company. There was no thought of Kirkland at that moment. But Kirkland has been coming with a rush, and so Continental Mines Limited came into existence with a capitalization of $3,500,000. Considering the acreage holdings in the silver and gold fields, this nominal capital is a violation of North Country precedents. Sponsors seem to have been chary of numerals or of ciphers, whereas the rule is to square nominal millions to conform to combined claim areas. Besides, Continental will have $1,000,000 in the treasury to start with. Manifestly the conception and execution is epochal. To have nearly 1,200 Kirkland-Cobalt acres next to productive areas valued so lightly is unprecedented, while a million or two applied upon much smaller areas is the merest detail.

Nipissing has its own treasury to draw on. Continental has sufficient to prove the correctness of the Warriner diagnosis that the three miles secured cover one or more of the lines of fracture, the main and possibly a subsidiary fracture—enough, if good enough, to provide a Proprietary Company similar to those of the Rand, such as those that operate the State Areas, Modderfonteins, Brakpan.

Basis of the Latest Enterprises

It took about ten years to convince discriminating capital that Kirkland Lake District is second only to Porcupine, and ultimately may share the honors with the greater camp that is now producing at the rate of about $18,000,000 per annum. Thus far, Kirkland Lake has accounted for approximately $7,500,000, notwithstanding the War and reverses that might have been avoided by better management and a clearer conception of the structures. Increasing values at depth and the knowledge that gold is disseminated over a large area finally have induced influential companies and capitalists to concentrate their efforts upon these fields, more so than upon any others.

Between the Kirkland Lake Proprietary, Tough Oakes, Burnside, and Sylvanite properties, and the Kirkland Lake Gold Companies, the main fracture, therefore, is commanding greater attention. Consequently it follows that mining men of experience, if they cannot get an inviting outcrop or a producing mine at or about the price of a prospect, have a liking for dips, curves, angles and extensions. In Canada there is no Apex Law entitling discoverers to follow ore bodies into other properties regardless of ownership. Therefore, finding two and three quarter miles occupied, the determination of such combinations as the Nipissing and Continental was to secure extensions.

This has been the policy throughout mining history. Some of those who held or were content with central outcrops at the Witwatersrand doubted whether the banket beds would go down. Hermann Eckstein and his contemporaries, the more far seeing of them, exercised their powers of divination when they pegged second, third, and fourth row deeps. It was their actions in this regard that established the "Corner House" as such, and made it the greatest gold mining organization in the world. Robinson forsook the richest section of the Rand and hooked on to the end of the line of reefs on the extreme western end of the Rand. Other powerful groups chose the Klandfontein, Germiston, Boksburg, Springs areas, which now include the Simmer & East Rand Proprietary, Consolidated

Van Ryns Geduld, Brakpan, and the numerous other chief sources of today's gold output.

It was the Central Rand (just as it is the Pearl Lake Section of Porcupine and the Central Kirkland Lake properties) that presented the Robinsons, Crowns, Ferreiras, May Nourses, Rose, Primrose, Goldenhuis, and the galaxy of mines that brought capital to the Rand and financed the extensions throughout forty miles of Main Reef.

The Struben's "started something" when they discovered gold bearing ores underlying the Main Reef Series. It was Bantjes who ascertained that the banket carried gold values. Comstock gave the States a "Golden West" after the California excitement, and made Bonanza Kings of Mackay, Flood, O'Brien and Fair. Stratton, Tabor, and the men of their day made a state out of a territory by what they found at Leadville, Cripple Creek, and the San Juan. Wilson and Edwards shook hands with the Fates at the Dome, and that brought Hollinger, Gillies, Dixon, Miller, Middleton and Davidson to Porcupine. Oakes, the Toughs, Wright and their fellows pioneered Kirkland Lake, exactly as LaRose, Hebert, McKinley, Darragh, Trethewey, Longwell, Leonard, and Lawson, created Cobalt. Interest broadened, and whenever areas were firmly held, recourse was had to the extensions. Now it is beyond question that the producing two-and-three-quarters miles of Kirkland Lake are apt to be merely introductory to what may result from the mapping if the main gold belt to the east of what was the Tough-Oakes. Mining at depths of from 600 to 1,000 feet, six companies are capitalized in the market much beyond their nominal capitalization.

Eastern Extension Located

No claims are made that the Nipissing-Continental lines of fracture will equal or surpass the results recorded by the producing mines of Kirkland Lake. The finding of the fissuring and confirmation of the geology for at least another mile to the east, on the Continental ground, is accepted as evidence of the lateral continuity of the gold-yielding section.

There is no intention to unduly magnify latest developments. Capable engineers are satsified that the primal conditions are present in the areas adjoining the Kirkland Lake Proprietary and Burnside. By training, manifesting their long-standing sense of responsibility in mining matters, they are disinclined to jump at conclusions. Of the twenty-seven claims held at Kirkland by the Continental Mines, all that is represented is that they are next door to the money and have the requisite geology; the drill and pick must prove the nature and character of what ore-bodies there are. Nipissing may have what it has sought and a proprietary company may be the outcome of Continental Mines' operations, somewhat similar to those at the Witwatersrand and those which have accomplished so much in the United States. Of course, all of this is prospective, and the melons to be cut are in perspective; yet the scope of Nipissing and Continental plans, carefully perfected, and following months of investigation, plainly implies that the moving spirits are favorably impressed by what they have thus far achieved since they decided to make a flying survey of an area that is accessible by automobile road, and where every operating economy is to be had without extra charge.

Continental Colonial Mines Acquisition

It is to be explained that the inception of Continental Mines is to be credited to Sudbury District principals; hence the presence of Messrs. McCrea and Buchanan, of Nickeldom, upon the Continental Board, along with President Warriner, ex-Governor Riggs of Alaska, who was a member of the Canadian-Alaskan Boundary Commission. Frederic Bull, whose family name is perpetuated because of its identification with Edward Sweet and Co., of the New York Stock Exchange, and others, including Chairman Home Smith of the Toronto Harbor Board, and William Wallace Mein, whose field representative has been Mr. Robert A. Bryce. Primarily a Copper Cliff executive decided that the Colonial Silver properties, abutting on the O'Brien and Violet (LaRose) Mines, were worthy of exploration. For years, Colonial owners had been importuned for terms. No one has doubted Colonial possibilities. They have been recognized all along and have been sought after. In the early days of Cobalt, the Colonial was capitalized at $6,000,000, produced about half a million ounces from milling rock, was litigated and has since remained idle. A small concentrator was erected and what work was done was by adit or on the surface. Milling rock then was inadequate for the Company capitalization. O'Brien and Violet operations, however, demonstrated that there is high-grade silver at depth in close proximity to the Colonial, along a contact where the diabase intruded. Since this contact proved so productive, periodic pilgrimages to Erie, where Mr. Ed. Germer resides, failed to land the Colonial on suitable terms. More success attended the efforts of the visitor from Copper Cliff, who closed a deal and turned it over to Continental Mines.

It is understood that those operating in adjoining ground were prepared to work the Colonial Mines on joint account with the holders of the rights. Both O'Brien and LaRose have first-hand knowledge of what there is underground at the O'Brien, and what is in the Violet. That is why Continental Mines have let a contract to sink a shaft to a depth of 800 feet, where it is expected to reach the contact and pick up the extension of the rich O'Brien vein.

The purpose is plain in the contract for the shaft—a three-compartment one. Ordinarily a co-operative arrangement with the O'Brien or the LaRose would be preferable. But, if the extension of the No. 6 Vein is there, it is worth going after. Never before has a shaft gone down so far at Cobalt for one purpose—and that is a real sporting chance taken by real mining men. They have an "almost" certainty, considering the O'Brien working face on No. 6 Vein is within a few rounds of their boundary, and for the further reason that the O'Brien people are sinking on this vein from the 800 to 1,000 feet. Before the existence of the O'Brien-Colonial contact was known, the Colonial properties were a great deal more problematical than they are now. Those best informed at Cobalt regard this as a venture of brightest promise.

LIQUID FUEL CONGRESS IN PARIS

The Society of Chemical Industry, 49 rue des Mathurins, Paris, will hold, on October 9th to 15th next, an International Congress for the discussion of liquid fuels. The Congress, which has been organized under the patronage of the French Ministers of Commerce, Agriculture, Colonies and Public Works, will be divided into six sections:

1 - petroleum
2 - oil shales
3 - lignite and peat
4 - tar and benzol
5 - alcohol
6 - vegetable oils

Coincident with this congress there will be held an International Exposition of liquid fuels, on the Esplanade des Invalides. This Exposition will be divided into two groups, — production and use. The first will include all the commercial sources of liquid fuels and the processes of manufacture to which they are subjected. The second will comprise exhibits demonstrating their use for motive power, industrial and domestic heating, and light.

Milling Slocan Ores

MILLS OF ROSEBERY-SURPRISE COMPANY

By J. P. Mc FADDEN

The following paper was presented by J. P. McFadden general superintendent of the Rosebery-Surprise Company, at the meeting of the International Mining Convention held recently at Nelson, B. C.

The operations of the company of which I am privileged to be superintendent, while rather small at present, have entailed the mining and milling of the ores of four widely separate Slocan mines, namely the Surprise mine on the north side of Carpenter creek, the Ivanhoe and Canadian group on the south side of Carpenter creek, both above Sandon, and at respective altitudes of 6700 and 5500 feet, and the Bosun mine at the level of Slocan lake, and halfway between New Denver and Silverton. The ores from these four mines were delivered by aerial tramway and either by rail or barge to either our concentrator at Sandon or that at Rosebery. Our efforts and results in the milling of these ores is the subject I will attempt to outline.

The Concentrating Problem

The flow sheet of both mills called for gravity concentration with the usual equipment of crusher, rolls, trommels,, jigs, tables and flotation, with machines of differing type in the two mills.

Gravity concentration in the Slocan is of course similar to the same process elsewhere in use on lead-zinc ores, but at the same time it has differences that perhaps should be mentioned. The mechanical separation of lead and zinc from one another and from the gangue material is ordinarily a simple matter, and calls for only a minimum of outlay in the way of milling equipment and construction. The fact, however, that the Slocan ores are very high in silver and often have the sulphides of lead and zinc intimately mixed through a gangue that is frequently very hard, together with the presence in the ores from some of the mines of large percentages of iron pyrites and iron carbonate, makes the problem more complex, and outlay for milling equipment and construction above the ordinary.

You will understand that the Slocan mines are primarily silver mines, and while the lead and zinc derived are, of course, necessary and acceptable products, they are, nevertheless, secondary in point of value. The difference in equipment and of construction is largely occasioned by the necessity for re-grinding a middling from all the jigs. This means additional rolls, elevators, trommels and jigs.

Character of Ore and Concentrate

The lead concentrate derived from the milling of a Slocan ore will run from 100 to 175 ounces per ton in silver. The lead is soft and very easily slimed, and it is more than advisable (in fact it is necessary to good extraction of both lead and silver) that these products be recovered in the coarsest possible state. Where the amount of lead in the mill feed will warrant it, picking belts are used. The next best device to the picking belt is the one or two compartment bull jig, where a lead concentrate only is saved as finished product, being as coarse as 3/4 inch. From a rich lead feed, a very considerable amount of the lead can be removed at this stage.

If you will size a general sample of the lead concentrate produced, you will find that the silver content of the different sizes made decreases very rapidly with the finer mesh. At every crushing of a piece of lead you produce a certain amount of very fine lead and slime which is difficult to save, some of it being impossible to save, especially in the presence of the very large volume of water needed throughout the process. Certainly so far as water concentration goes, the silver, as argentite, tetrahedrite, ruby silver or other silver compound, in the lead or zinc sulphide, must be saved while it is in association with these sulphides. The sliming of either the lead or zinc sulphide, and more especially the lead, frees a great deal of the silver and once this is accomplished, you can say "goodbye" to it. Our experience has been that it is then practically impossible to settle it from the water.

Lead Concentrate High in Zinc and Silver

A stranger, examining the assay returns of our lead shipments, might reasonably judge that we were making a very dirty or zincy product, and either wonder why this was so, or assume that the association was so complex that a better separation could not be made. With our ore, it is perfectly feasible to make a lead concentrate running 65 per cent. to 70 per cent. lead and 6 per cent. to 7 per cent. zinc; but we determined that it was greatly to our advantage to produce a finished concentrate assaying about 55 per cent. lead and 10 per cent. zinc, the whole idea of this being to recover the silver at the earliest possible stage in the operation and thereby avoid as much as possible the regrinding of a rich middling, with its consequent loss of lead, and especially silver, through sliming. The higher zinc content of course entails a higher smelting charge, but the increased extraction obtained, especially in silver, more than offsets this. This procedure would not necessarily be applicable in the production of a lead concentrate that did not carry high silver values. Just where to draw the line would depend largely on the marketing prices of the metals, smelting charges and freight.

The Equipment

With the above discussed object in view, practically all the concentrators in the Slocan have been laid out on very much the same lines. The personality and experience of different operators finds expression more in the technique of handling the equipment than in the use of widely varying styles of machines. A list of equipment of our Rosebery concentrator, with a capacity of 150 tons per day, consists of

One 20 x 30 Blake crusher
One Gates, 10-2 gyratory crusher.
One set of primary rolls.
One set of intermediate rolls
One set of fine rolls
Two 2 compartment Hartz ball jigs
One 4-compartment Hartz jig.
Five 4-compartment Hartz jigs
One 4 by 6 Chalmers & Williams ball mill
One Door duplex classifier
Eight Wilfley tables
One Deister slime table
One 8 foot Dallow cone
One 18-foot Dorr thickener for flotation feed
One 18 foot Dorr thickener for flotation concentrate
One Dallow pneumatic cell
Four Hones-Dorr flotation machines
One 4 by 6 Portland filter

The Flow Sheet

The ore is received direct from the mines in railway dump cars and is either crushed direct or dumped into storage bins of 1,400 tons capacity. When crushed direct, the car is dumped over a small bin between the railway track, under which travels an 18-inch belt con-

veyor, the bar acting as a bin until its contents have been removed by the conveyor to the Blake crusher, which is set for crushing to two inches. From the crusher the ore is carried by belt conveyor, which is also utilized as a picking belt, to the gyratory, which reduces it to one inch size. From the gyratory the ore goes to the mill feed bin by elevator.

The ore is fed to the primary rolls by means of an Allis Chalmers style "H" feeder. At this point a sample of the feed is taken every 15 minutes by catching the full discharge of the feeder in a pan through a period of 30 seconds. The large sample obtained from the accumulation of these samples through a period of 24 hours is then cut down to a 10 pound sample, as representative of the previous day's mill feed. Every alternate one of the interval samples is weighed to determine the tonnage going through the mill.

After passing through the primary rolls, the ore is raised by bucket elevator to the trommel line, which consists of four 48 by 80 inch trommels, of 12, 9, 6 and 3 millimeters. The sized products of the trommels go to jigs. All material finer than three millimeters goes to a Culver hydraulic classifier, from which the coarse sand is sent to a fine jig and the overflow to a 50-foot "V" shaped settling tank which distributes a thickened product to the Wilfley tables. The overflow of the "V" settling tank goes to the flotation feed Dorr thickener.

The middling from the bull jigs is returned to the intermediate rolls, and the middling of jigs handling material between six and 12 millimeters is returned to the fine rolls, while middling smaller than six millimeters goes direct to the ball mill to be ground for flotation. The discharge of the intermediate and fine rolls is delivered back to the head of the trommel line.

With all ores except the Bosun, lead and zinc concentrates are made on all the jigs from both cups and hutches. The Bosun ore carried too much iron to permit a jig zinc concentrate to be made, and it was necessary to send it on to flotation.

The Flotation Plants

Our flotation plants, both at the Surprise and Rosebery mills, were made necessary by the large amount of iron carbonate in the ore from the Surprise mine and the iron pyrites in the ore from the Bosun mine, which meant a very heavy zinc loss, coupled with a more serious silver loss. To this was added the incentive during the war period of the very high prices obtainable for both silver and zinc.

As an illustration of this necessity I will cite the results of the milling of 8544 tons of Surprise ore in 1915, in what was then the Ivanhoe mill, which was fully equipped with the necessary machinery for gravity concentration only. The average assay of the 8544 tons milled was 27.7 ounces of silver, 8.6 per cent. lead, and 19.2 per cent. zinc. From the milling of this lot of ore we derived 117 tons of lead concentrate with an average assay of 118 ounces of silver, 62.7 per cent. lead, and 9.7 per cent. zinc; 2456 tons of zinc concentrate assaying 23.8 ounces silver, 3.4 per cent. lead and 39 per cent. zinc. The mill feed was carefully weighed, and if we subtract the concentrate tonnage, which figures are smelter dry weights, we have remaining as tailing 4978 tons, which had an average asay of 5.6 ounces of silver, 0.3 per cent. lead and 9.1 per cent. zinc, or a total loss in tails of 27,656 ounces of silver, 14.5 tons of metallic lead, and 452 tons of metallic zinc, the 452 tons of metallic zinc being equivalent to the loss of 1130 tons of 40 per cent. zinc concentrate. From the above figures you may readily realize the incentive to undertaking the installation of flotation equipment, and the wading through that mire of experimentation which was our lot before we finally arrived at a satisfactory practice.

Our flotation work was begun in the fall of 1916 upon completion of the Surprise mill at Sandon. The flotation unit consisted essentially of a ball mill, a Dorr thickener, and a series of flotation cells manufactured by the Minerals Separation Company and sent to us in about 10,000 pieces (more or less). The Minerals Separation unit consisted of four Hebbard cells for the selective flotation of lead, followed by a group of four standard cells in series with eight Hebbard cells for zinc.

The primary flotation feed was sent to the first of the Hebbard lead cells, after being oiled with cresylic acid, for the selective floating of the lead. After passing through the four lead cells, from which a lead froth was taken, the pulp was discharged from these cells, and after re-oiling for zinc with water-gas tar and hardwood creosote, was elevated for delivery to the first of the four standard cells from which a finished zinc concentrate was taken. The pulp then flowed, by gravity, through the eight Hebbard zinc cells, and thence to tails. A middling froth was taken from the eight Hebbard cells, and returned to the standard cells for cleaning.

Good Recovery of Silver

The flotation feed would run 25 to 30 ounces in silver, 1.5 to 2.5 per cent. in lead, and 10 to 15 per cent. in zinc, the high zinc feed being due to the fact that no zinc concentrate was made in the gravity end of the mill. We were able to make, by selective oiling, a flotation lead concentrate assaying 40 to 45 per cent. in lead and 25 to 30 per cent. in zinc and ranging in silver from 200 to 300 ounces per ton. About 1 pound of cresylic acid per ton of ore treated was used. The operation was, however, a very delicate one and required almost constant attention. Th reduction in the lead content of the feed through this process was not great, so that the greater part of the lead in the flotation feed went on to be collected later in the zinc concentrate. The good purpose that this operation did serve was to provide a medium, not too ziney, for collecting the silver, which had been freed through sliming and was floating free of lead or zinc sulphide. The fact that a larger percentage of the lead was not removed in this operation was due, not to the fact that lead is difficult to float, but to the necessity of restraining the zinc.

Previous laboratory experiments had given us reason to expect better results from the zinc end of the flotation unit than we were able to obtain during the first few months of its operation. No difficulty was experienced from the first in taking off a good grade of zinc concentrate from the standard cells, but the tailing results through the early period of operation were unmentionable. Weeks of experiments followed, and many kinds of oil were used in varying quantities. Various densities of pulp, combinations of cells for re-treatment, re-oiling at later stages in the flow of pulp, varying degrees of fineness of feed, and any number of what you might call "stunts", were tried.

On the Minerals Separation unit as it stood we were not able to average better than a tailing assaying six ounces of silver, a trace of lead, and zinc 5 per cent. The oils used were five pounds of water-gas tar and 0.6 pound of hard-wood creosote per ton of ore treated. Before the war and at present, such a tailing is bad enough, but during the period of war prices it was awful!

Our next move was the installation of a Hynes machine, details of which I shall describe presently, to treat the tailing of the Minerals Separation machine for the recovery of the remaining zinc and silver. This machine was oiled with 0.3 pound of water-gas tar and 0.02 pound of Pensacola No. 350 pine oil. It delivered a very light and voluminous froth of small bubbles. It lifted most of the remaining zinc from the pulp, and with it considerable gangue. The concentrate taken from this machine assayed about 10 per cent. zinc and was returned to the head of the standard cells for cleaning. The average of the tailing from this machine over a period of 30 days would be two ounces of silver and 1.7 per cent. zinc.

The Hynes Flotation Machine

The Hynes machine consists essentially of a rotor, mounted horizontally, and its containing box or tank. The construction of the tank is similar to that of the K & K. machine, the advertising cuts of which are familiar to almost everyone. A settling trough or spitzkasten is provided along the front of the tank for the collecting and cleaning of the concentrate. The dimensions of the tank of a medium sized machine are, length six feet, width five feet and a half, and depth four feet.

The rotor consists of a 3 7-16 inch shaft, upon which are mounted perforated sheet metal discs 30 inches in diameter and 1¼ inches apart. The sheet metal discs are of 12 gauge, with ½ inch perforations, spaced 7-8 inches between centers. An area 12 inches square is left blank in the center of the disc, and the center of this square is bored and notched to take the shaft and key. The interval between the discs is maintained by means of dry fir spacers 1 1-4 inches thick conforming to the pattern of the blank square in the center of the disc.

The discs and spaces are slipped on to the shaft, the notch in the center of the discs fitting over the shaft key which extends the full length of the disc line. The spacers and discs are drawn firmly together by means of four 3-4 inch tie rods running the full length of the disc line and passing through the corners of the blank square in the central portion of the disc.

The rotor shaft is supported by bearings mounted outside the tank. A rotor, operating in a tank of the size mentioned, mounts 50 discs. Our practice required a speed of 90 revolutions per minute for the rotor shaft. The pulp enters one end of the machine, and passes out at the other, with the level maintained approximately at a point just below the shaft line by a device on the discharge end. It is necessary, however, to vary the pulp level slightly from time to time in order to control the flow of froth. The chief virtue of this machine, I believe, lies in the excellent aeration of the pulp resulting from the air entrained by the rotating perforated discs.

Rosebery Mill

The flow sheet of the gravity end of our Rosebery mill has already been described. The equipment of the flotation end consists of a 4 by 6 foot ball mill, one 28-foot and one 18-foot Dorr thickener, one small Callow pneumatic cell, 4 Hynes disc flotation machines, and a 1 by 6 Portland filter.

The Dorr duplex classifier, which is in circuit with the ball mill, is adjusted to deliver a pulp for flotation, all of which will pass 60 mesh, and 75 per cent. pass 150 mesh. This pulp is elevated to the "V" shaped thickener feeding the Wilfley tables and the thickened pulp is run over Wilfley tables and one Deister slime table where most of the remaining lead and part of the iron are removed. As no zinc is made on the tables, the table tailing includes all zinc sulphide present in the primary feed to the mill except that removed on the jigs. This pulp goes to a 28-foot Dorr thickener to be thickened, before sending to the flotation machines. The thickener discharge is controlled so as to deliver a pulp carrying 30 to 35 per cent solids. The thickened pulp is then elevated by a centrifugal pump to the head of the flotation machine unit.

Rosebery Flotation Equipment

The flotation machine unit consists of two 35-disc Hynes machines, one 50-disc, and one 100-disc machine arranged in cascade so that the feed, after entering the first of the 35 disc machines, flows by gravity through each of the others in succession. The second 35-disc machine takes the tailing of the first, the 50-disc takes the tailing of the second 35, and the 100-disc machine treats the tailing of the 50. A finished concentrate is made on three smaller machines, and a middling concentrate on the large machine. The middling concentrate, assaying 10 to 12 per cent zinc, is returned to the head of the flotation unit for cleaning.

The first oil is added at the centrifugal pump, operating between the thickener discharge and the head of the flotation unit. Oil is also added at each of the machines as conditions demand.

No difficulty is had in making a 40 to 42 per cent. zinc concentrate from any of the ores treated. The last 30-day run on Bosun ore, with a flotation feed running 57.7 ounces in silver, 0.9 per cent. lead, and 12.6 per cent. zinc, yielded a zinc concentrate assaying 95 ounces in silver, 2.9 per cent. lead, and 44.0 per cent. zinc, and a final flotation tailing of 1.4 ounces in silver, lead nil, and zinc 0.6 per cent.

The last mill runs at Rosebery on Surprise ore, Ivanhoe ore, and Canadian group ore, gave the following average results from the flotation unit through a milling period: Surprise ore, with flotation feed 22.3 ounces in silver, lead, 1.2 per cent., zinc, 11.7 per cent., gave a flotation zinc concentrate assaying 94.5 ounces in silver, lead 5.0 per cent., zinc, 42.6 per cent. and tailing, 3.7 ounces in silver, lead nil, and zinc, 3.0 per cent. Ivanhoe ore, with a flotation feed running, silver, 12.0 ounces, lead, 1.1 per cent., zinc, 9.8 per cent., gave a zinc concentrate of 45.0 ounces in silver, lead and zinc, 0.8 per cent. Canadian group with a flotation feed of 12.0 ounces in silver, lead, 1 per cent., and zinc 9.6 per cent. gave a concentrate of 53 ounces in silver, lead 3.9 per cent. and zinc 11.9 per cent., the tailing running 0.6 ounce in silver, lead nil and zinc, 0.6 per cent.

The samples of the feed, concentrate and tailing, of which I have just given the assay results, are taken automatically every three minutes and are not subject to the personal equation.

The Flotation Oils

The oils used in the flotation of zinc at Rosebery are water gas tar and Cleveland Cliffs hard wood creosote, mixed for use with Surprise ore in the ratio of four water gas tar to one creosote, and for use with Bosun, Ivanhoe and Canadian ores in the ratio of three water gas tar, to one creosote. The oil consumption on the four different ores was as follows:

On Surprise ore, water gas tar, 0.81 pound and creosote 0.21 pound per ton dry ore treated.

On Bosun ore, water gas tar, 0.75 pounds and creosote, 0.25 pounds per ton dry ore treated.

On Ivanhoe ore, water gas tar, 1.50 pounds and creosote, 0.50 pounds dry ore treated.

On Canadian group ore, water gas tar, 1.05 pounds and creosote 0.35 pounds dry ore treated. The oils were fed hot by feeders of the wheel and scraper type. Electric heaters were used to keep the oils at the proper

temperature. I attribute the difference in the consumption of oils at the Rosebery as compared to the Sandon plant to the more perfect aeration of the pulp by the Hynes machine.

Preliminary Chemical Treatment

A flotation lead concentrate was made from Surprise ore by treating it first in a small Callow pneumatic cell before sending it to the Hynes zinc machines. Three-tenths of a pound of cresylic acid per ton treated was used in this operation. The amount of concentrate realized was not very large, and would assay about 350 ounces in silver, 23 per cent. lead, and 22 per cent. zinc. We were never successful in making a satisfactory lead concentrate in this machine from Bosun, Ivanhoe or Canadian Group ores. The product was very zincy, and also the excess cresylic acid that would be carried through into the Hynes machine would cause an uncontrollable froth when used in connection with the three ores mentioned. This uncontrollable froth, I think, was occasioned by the action of the highly aerated pulp, in conjection with the cresylic acid, upon the graphitic matter in the gangue rock of these ores, which was soft slate. This difficulty was not experienced with the Surprise ore when using similar amounts of cresylic acid under the same conditions. The gangue rock of the Surprise ore is a hard quartz porphyry.

In order to make a satisfactory zinc concentrate on the Bosun, Ivanhoe and Canadian group ores, it was necessary to add a solution of copper sulphate to the pulp. This copper sulphate was introduced at the pump between the thickener and first flotation machine, the consumption being 0.75 pounds of copper sulphate per ton of ore treated.

Tests with Copper Sulphate

Early in our practice, being in serious difficulty in the making of a satisfactory zinc concentrate on the Bosun ore, we tried the copper sulphate, as we had heard of its use elsewhere and obtained, almost immediately, satisfactory results. Later we did some experimenting to determine, if possible, the reason for the reaction. What work we did went to show that the action or re-action was not in restraining the floating of the iron pyrites nor in decreasing the zinc content of the tailing. A test was run over a period of 10 days, during which time copper sulphate was used on every alternate day. The zinc and iron content of the flotation feed, concentrate and tailing were determined each day and the results tabulated with and without the copper sulphate. The average of the feed in both cases was the same in zinc and iron percentage namely, 5.1 per cent. zinc and 6.1 per cent. iron, and it was observed that the average tailing percentage in zinc and iron was the same, being a little over 3 per cent. in zinc and 6 per cent in iron in each case. The concentrate zinc percentage, however, had increased by 10 points in the average where copper sulphate had been used. Our deduction was that the copper sulphate had a coagulating effect upon the slime, or a restraining action upon the graphitic matter, causing at least part of it to pass into the tailing instead of rising with the froth. This theory is strengthened by the fact that no copper sulphate is necessary when milling Surprise ore, which does not slime readily, and carried no graphitic matter.

Graphic Curves to Aid Operators

For the use of the flotation operators, curves for determining the percentage of solids in the flotation feed and for determining the flotation tonnage going through the machines were kept posted in the mill. I will not go into the matter of the derivation of the formulas upon which these curves are based. For their use, the operator catches a sample of the pulp coming from the thickener in a container holding 750 cubic centimeters and weighs this sample. Having the weight, he can find the percentage of solids by reference to one of the curves. He then turns the feed nozzle into a box measuring 12 by 15 by 20 1-3 inches and observes the time in seconds required to fill it. Knowing the percentage of solids and the time required to fill the box, reference to a second curve gives the tonnage per hour passing through the machines. This information is recorded every 30 minutes.

For what results we have been able to obtain I wish to give great credit to F. J. Murphy, who was with us as mill superintendent for three years, when he was transferred to Mexico to take charge of larger milling operations there. During the last year of milling operations J. Reid, of Rosebery, was actively in charge of the Rosebery mill as foreman.

STANDARD SPECIFICATIONS FOR WIRE ROPE

The Canadian Engineering Standards Association has recently completed and published a Standard General Specification for Wire Rope for mining, dredging and steam shovel purposes. Copies of this publication may be obtained from the Secretary of the Canadian Engineering Standards Association, Room 112, West Block, Ottawa, Ontario. As stated in the preface, the Specification is intended to embody those requirements for standard grades of wire rope for mining, dredging and similar purposes that are regarded as essential in order to protect the purchaser against an inferior and defective product and to guide the manufacturer or importer as to standard practice in Canada.

The Sectional Committee on Wire Rope was appointed in 1919 by the Main Committee of the Canadian Engineering Standards Association. The members were: chairman, Prof. H. M. MacKay, McGill University; K. M. Cameron, Dept. of Public Works, Ottawa; H. B. Greening, B. Greening Wire Co., Hamilton; F. H. Hopkins, Dominion Wire Rope Co.; A. W. Robinson, Consulting Engineer; T. F. Sutherland, Ontario Dept. of Mines; J. S. White, Acadia Coal Company. Two subcommittees were appointed one on wire rope for dredging and steam shovel purposes and one on wire rope for mining purposes.

Wire ropes made in accordance with these specifications shall be known as C. E. S. A. Standard Hoisting or Haulage Rope and may bear the distinguishing mark of the Association.

After considerable study of the subject it was decided to classify the material for wires under three grades only: Crucible Cast Steel, Plough Steel and Special Plough Steel. Crucible Cast Steel is an acid or basic open-hearth or Bessemer steel of medium carbon content with a tensile strength of 160,000 to 210,000 pounds per square inch. Plough Steel and Special Plough Steel are high-grade acid open-hearth steels with a carbon content of 0.50 and upwards, Plough Steel having a tensile strength of from 200,000 to 230,000 pounds per square inch, and Special Plough Steel from 220,000 to 270,000 pounds per square inch. In each case the lower figure is the minimum requirement of the ultimate tensile strength of the wire. The permissible variation allowed in the diameter of wire is 0.005 inch for wire 0.064 inch and larger and +0.003 inch for wire below 0.064 inch.

(Continued on next page)

Institution of Mining Engineers

ANNUAL SUMMER MEETING AT SHEFFIELD

By ROLAND H. BRIGGS

The Annual Meetings of the Institution of Mining Engineers have this year been held in Sheffield, England, and a large number of members were present. Several interesting papers were read at these meetings, amongst which were included a report on "*Rock Temperatures in the Coal Measures in Great Britain*," by Mr. J. Ivon Graham, M. A., M. Sc., Assistant Director of the Mining Research Laboratory of the University of Birmingham, a paper on the "*Rate of Absorption of Poisonous Amounts of Carbon Monoxide by the Blood*", by Mr. A. P. Veale of the same Laboratory, a description of "*Methods of Working the Barnsley Seam of the South Yorkshire Coalfield*", by Messrs. H. and M. Rhodes, and some details with regard to the "*Air Cooling Plant at the Morro Velho Mine of the St. John Del Rey Mining Company Limited, Brazil*," by Mr. Eric Davies, B. Sc., A. M. Inst. C. E.

A Brazil Plant for Cooling Air

The installation of this mine cooling plant in Brazil, the whole of which was manufactured in Britain, has been attended with most satisfactory results, some of the most important of which were quite unexpected. For instance, since the installation of the plant, a great reduction in accidents to the miners has taken place, so that the percentage of accidents is now satisfactorily low, instead of being so high as to give the mine a bad name. This remarkable result is accounted for by the fact that, owing to the more bracing condition of the mine atmosphere, the men are more alert and can perceive and avoid danger with greater celerity.

Owing to the variations of air temperature caused by the seasons and the time of day, the plant is divided into six stages, so that any number of the stages can be shut down as the outside atmosphere cools, so as to maintain a constant temperature in the mine. The air is drawn through the air coolers by two 60 inch single inlet Sirocco fans, belt driven at about 105 r.p.m. by 50 h.p. electric variable speed motors, delivering into a common duct which communicates with the downcast shaft through a tunnel 850 feet long. The air coolers are of the "Heenan" type, and consist of a number of cylinders 10 ft. 10 ins. in diameter by 8 ins. wide, weighing three tons each, and built up of galvanized steel plates arranged in a long spiral, so that the radial gap between the outside of one plate and the inside of the next (through which the air passes) is about ⅛ inch. The total length of plate per cylinder comes to about 5,400 feet. Each air cooler has nine cylinders which are arranged on a common shaft rotated at about 3 revolutions per minute. The lower parts of the cylinders are immersed in cold water.

There are two water tanks and one evaporator to each stage, each evaporator containing from 11,980 to 6,960 feet of ammonia pipe coils, or 10½ miles of pipe in all. Circulation of the water is obtained by means of a motor-driven centrifugal pump, of 400 gallons capacity against a 20-foot head. There are six ammonia compressors, one for each stage, these being single cylinder, double acting machines 11 5/8in. diameter and 21 in. stroke, belt driven at 81 r.p.m. by 120 h.p. motor. The condensers are of the double pipe type, and there is a small vertical compressor for pumping-out purposes. Messrs. J. and E. Hall Ltd. of Dartford were the main contractors, while the air coolers were manufactured by Messrs. Heeman & Froude, Ltd. of Worcester, and the electrical plant by the General Electric Company, Ltd. of Witton.

The Barnsley Coal Seam

The paper read by Messrs. H. & M. Rhodes dealt with methods of working the famous Barnsley coal seam in South Yorkshire, which underlies an area of at least 1000 square miles, and which has been proved along the outcrop for sixty miles, from Leeds to Nottingham, and has been met with as far east as Southsear near Doncaster, at a depth of 3,180 feet. Fifteen million tons per annum are now raised in the South Yorkshire Coalfield from the Barnsley seam alone. The seam varies considerably in thickness, but at most points lies between the limits of 4½ and 10 feet.

The great value of this seam is due to the fact that a portion of the seam is semi-anthracite, particularly suited for locomotive and marine use, and for iron-smelting. There are alternating beds of semi-anthracite and a more bituminous coal. The "hards" usually are about three feet thick throughout the whole area. In addition to the general use of all classes of fuel produced from this seam for steam, house and gas making purposes respectively, over the greater part of the district the small coal makes excellent coke, and is now exclusively coked in by product ovens after having been washed in Baum, Coppée and Humboldt washers.

The seam has been worked for centuries and is mentioned in the time of Henry the Eighth. About a century ago the method adopted was to form the coal into large pillars by narrow drivings and work the pillars off by lifts about 20 yards wide. About 1840 this method was given up, and the coal worked by banks or stalls about thirty yards wide with pillars of about the same width. Between the years 1847 and 1857 four serious explosions took place, accompanied by much loss of life: Oaks (73 lives lost), Darley Main (75 lost), Warren Vale, (52 lost) and Lundhill, (189 men and boys lost). Lundhill was considered to be a model colliery and the explosion drew the attention of mining engineers to the methods of working in the South Yorkshire district.

The requirements for the methods of manufacture of the wire itself, the use of filler wires, joints in wires, lubrication of hempen core and laying up of rope are simply those followed by reputable wire rope manufacturers.

The torsion test required that the wires shall not break, split or show any defect on 25 complete turns per length of 100 diameters.

Three standard constructions are recognized for hoisting ropes, 6 by 19, 6 by 19 Seale type, and 6 by 37.

Appendix I. gives the information that is to be furnished to the vendor by the purchaser and includes the following data, which are extremely important and yet are often overlooked when ordering hoisting ropes: purpose for which the rope is required, maximum running speed, minimum working load, diameter of sheave and diameter of drum.

Appendix II. gives the information that the manufacturer is to supply the purchaser and includes particulars as to the construction of the rope, the grade of material of wires, the tensile strength of wire and the guaranteed ultimate tensile strength of the completed rope.

T. E. S.

After the Lundhill explosion the bank system of working the Barnsley seam was practically abandoned, and the wide bank and pillar system or the bord and pillar system took its place. The longwall system of working was gradually introduced between 1866 and 1879, and with the exception of one or two of the oldest collieries, which are working out a few pillars, the longwall method of working the Barnsley seam is now universal.

Mining Method

Except in the district south of the Don Faults, it is customary to timber under a greater or less thickness of the Top Softs, the bulk of which are recovered in the gates and behind the timber in the wastes. The seam is thus worked in two operations, the thickness of the first working varying from 1½ to 7 feet. The width of the stalls varies from 22 to 50 yards, and from 2 to 8 men per shift are employed in each stall according to its length. The use of the shorter stalls is confined to those collieries that have gradually evolved their longwall from some earlier method, and also to those pits where ripping the Top Softs in the gates provides sufficient height without cutting into the roof in the ordinary stall roads, the pack material being supplied from back-ripping the main roads and cross-gates, the packs in some cases being put on under separate contract.

At the more modern and deeper collieries wider stalls are used, and the increased depth makes it necessary not only to take down top coal in the gates but also to rip from 1 to 3 feet of stone down as well. The distance between the crossgates varies from 80 to 120 yards, and they are generally packed out as the face advances without disturbing the general line on which the faces work, the men employed in each stall being responsible for carrying the cross gate across their face. The gate and crossgate packs are usually from 6 to 9 feet thick, and are in some cases strengthened by chocks, 2 ft. square, made of old timber, set about every six feet. These chocks may be dispensed with in pits liable to gob-fires, and the gate packs are then made considerably wider.

Good Production per Man

It is the usual practice for the men employed in each stall to do all the timbering and packing and to be responsible for the first ripping, and the average output per man in these circumstances is about 4 to 5 tons per shift. Since the introduction of the Seven Hours Act, about 40 per cent. of the total number of men employed, both surface and underground, work at the coal face, and where the output is as high as 5 tons per man per shift employed at the face, the average production per man employed both surface underground, is about 2 tons per shift, with a proportionate reduction where the face worker produces less coal. It is estimated that at the moment the average production per man and boy employed in the Barnsley Seam collieries is not far short of 400 tons per year, which is considerably higher than the average in Britain.

In some of the older pits it is the practice to tram the coal from the face to the pass-by, the tonnage rates in such cases including tramming for a distance up to say 80 yards. In other collieries tubs are taken from the face by ponies, but the use of small compressed air or electric hauling engines for hauling direct from the face is increasing very rapidly, some collieries having dispensed with the use of ponies altogether. In the more easterly pits, where the full dip does not exceed 1 in 25 or 1 in 30, the force of gravity is used for pulling in the empties. The main haulage is usually on the endless rope system, but the direct and head- rope and main-and-tail systems are still extensively used.

Selective Mining of the Coal

Whatever system of working is adopted, it is the practice to fill the Hards and Softs separately, and a typical example of the operations is as follows. The Softs are first kirved or holed out and filled separately. The Hards are then dropped, the lower portion of the Top Softs being supported temporarily. The Top Softs are then taken down and permanent props set to support the bags and day-bed. As the faces advance, the latter props are drawn out, and the bags and day bed immediately fall and are filled out.

Tests with Carbon Monoxide

In the paper on the rate of absorption of poisonous amounts of carbon monoxide by the blood, Mr. A. P. Veale described experiments which he himself undertook, both in a state of rest and when undergoing exertion, while breathing air containing measured quantities carbon monoxide.

It is satisfactory to be able to record that while the experiments produced headaches and weakness of greater or less severity, they did not result in permanent injury to the health of the experimenter; indeed, he proposes to carry out further tests.

The tests were eight in number and they showed that where no work is undertaken in atmospheres containing carbon monoxide up to 0.114 per cent., a maximum of 40 per cent. of the amount inhaled will be absorbed. In cases where work is undertaken under similar circumstances as the above a lower percentage is absorbed, but the greatly increased rate of breathing and consequently the volume breathed, far more than makes up for this. In actual work underground, four times the absorption of that of a person at rest should be allowed. Thus a man would only have one-fourth of the time at which he would otherwise have at his disposal in which to escape to safety. The absorption rate will also vary with the physical fitness of the subject.

The conclusion drawn from these experiments is that no one should ever go into a suspected atmosphere unless accompanied by a small warm blooded animal, which should be a linnet for preference. A mouse or bird will, during rest, absorb carbon monoxide at a rate approximately fifteen times faster than a man who is also resting. But as the man will be walking and the bird or animal resting in a cage, he will be absorbing much more carbon monoxide, and this reduces the factor of safety to about four. Thus the moment the bird collapses or falls off its perch the explorer should return at once, as there is very little time to lose. In addition, a man is rather more sensitive to carbon monoxide than a mouse or bird, which further reduces the factor of safety.

Temperature in Mines

A long report containing a very great deal of valuable data was presented by Mr. Ivon Graham, M. A., M. Sc., this being a report to the "Committee on the Control of Atmospheric Conditions in Hot and Deep Mines." Large numbers of tests have been made in different coal mines and different coalfields, by means of a special apparatus that gave the temperature at the bottom of special boreholes drilled sufficiently deep into the rock or coal to give the true rock temperature, instead of the temperature at the face, which may be lowered by the ventilating air current or by the giving off of gas.

The results obtained from these tests show that in different parts of Britain there is considerable variation

in the Geothermic Gradient. In the Stalybridge area figures of 1 deg. Fah. in 72 feet were obtained, while near Wigan, also in Lancashire, it is 1 deg. Fah. in 56 feet. There may frequently also be a change of gradient with change in depth, as for example at Brodsworth in South Yorkshire, where the gradient was 1 deg. in 60 ft. at 1800 feet; 1 deg. in 56 ft. at 2300 feet; and then reverted to 1 deg. in 59 ft. at 2500 feet. A similar change was obtained at Hatfield and other figures confirmed these results. In Fifeshire figures in the carboniferous limestone series have given variations of 1 deg. in 70 ft. to 1 deg. in 94 ft. reverting to 1 deg. in 80 ft. with increase in depth.

The point of special interest in this connection is how far the strata temperature influences that of the air in the underground workings. Temperature can be controlled by efficient ventilation so as to be well below the strata temperature. This is usually shown in the main intakes of well ventilated pits. In one case in deep workings the strata temperature was 105.5 deg. F. while the air temperature was only 87 or less, and this at a distance of three-quarters of a mile from the pit bottom. As the quantity and velocity of the air are diminished in the workings the influence of the temperature of the surrounding strata increases.

In many cases the air temperature at the coal face is actually higher than that of the strata. This is due to compression of the air, oxidation of the coal, timber or other material, and heat conducted from the strata, the latter being out-balanced by the former. It has been shown that heat due to compression amounts to 1 deg. F. in 182 feet, so that in Britain, whenever the strata are found to be at a lower temperature than the air, it is due to the heat from oxidation being excessively high. As the surrounding strata are such poor conductors of heat, the only practical means of lowering the temperature is by increased ventilation or by bringing the fresh air to the working place at a lower temperature. This production of heat usually arises from the oxidation of coal, or sometimes of pyrites, and in the case of damp working the decay of timber may be a contributory factor of considerable importance.

Geological Reports on Yukon and British Columbia

In *Summary Report*, 1921 *Part A*, of the Geological Survey, Ottawa, just issued, there are contained seven reports dealing with field work in British Columbia and the Yukon during the season of 1921.

Silver-Lead Deposits of Davidson Mountains, Mayo District, Yukon

W. E. Cockfield's report on this area is accompanied by three maps, of Stand-to Hill, Rambler Hill and Mount Cameron districts, respectively. These areas are five to ten miles north of Keno Hill and 45 miles northeast of Mayo.

On these three hills there have been discovered veins in fault-fissures in schists, gneisses, quarzites and limestones of Pre-Cambrian age. These rocks have been intruded by granite. In the veins there occur, in zones parallel to the walls, argentiferous galena in a gangue of siderite and quartz. The veins have not been sufficiently developed to demonstrate their value; but meantime it has been determined that the ratio of silver to lead in the galena is only about one-third that of Keno Hill. The present expense of transportation prohibits the exploiting of the veins thus far discovered.

Upper Kitsault Valley, British Columbia

During the field season of 1921, George Hanson mapped an area of 50 square miles, north of Alice Arm, containing the famous Dolly Varden mine and a number of silver and copper prospects. The veins occur in volcanic and sedimentary rocks of Jurassic (?) age, and are due no doubt to the presence of the great Coast Batholith, a few miles to the West.

The value of the ore deposits is due to secondary enrichment that took place in pre-glacial times. By this means parts of the Dolly Varden vein, in the upper levels, were made exceedingly rich in silver. Comparatively little intensive prospecting or development work has been done, apart from restricted areas on a few of the more prominent properties. Mr. Hanson stresses the need for surface prospecting, and adds:

"The volcanic fragmental rocks of the Dolly Varden formation are worth prospecting for silver bearing veins. The purple and red members of this formation do not appear to contain any silver veins, the grey or green members containing all the known silver veins in the district.

"Secondary enrichment has not proceeded at a uniform rate throughout any area, nor even in any particular vein. Consequently, if a vein is stripped in a few isolated places and found to be too low grade, for mining in these places, it does not follow that the intervening parts of the vein are also of low grade, and vice versa. In prospecting the silver-bearing veins in the district, thorough surface examination is of the greatest value.

"Surface prospecting would probably be of value along the Dolly Varden mineral zone, the North Star-Torie-Ruby mineral zone, and the extension of the Ruby zone.

"If the values are contained in a native silver, ruby silver ore, it is probable the silver content will decrease in depth. Where the silver is contained in a grey copper-galena ore, the values will probably be more persistent in depth.

"Where surface ores contain thick plates and leaves of silver and similar seams of ruby silver, and where fracturing has been extensive, high values can be expected to continue to greater depth than where surface ores contain very thin flakes of native silver, etc.

"It is worthy of note that the high grade silver values are obtained from a siliceous ore. In barite veins, the higher grade vein matter is found in quartzose shoots."

Coast and Islands of British Columbia between Burke and Douglas Channels

This report describes the geology and mineral deposits of a portion of the coast 120 miles long, including Princess Royal Island. Mr. V. Dolmage is the first geologist to make a detailed examination of this part of the coast.

The coastal area of British Columbia is a partially submerged mountain range, the valleys having become fiords and the hills islands. The area described is composed mainly of quartz-diorite of the Coast Batholith, of Upper Jurassic age. Included in this are areas, comparatively small, of pre-existing schist and gneiss of Upper Triassic (?) age, and cutting it there are dykes (Bella Bella formation) of late Tertiary age. In one place volcanic rocks of post Pleistocene time were found lying on glaciated surfaces, evidence of very recent eruptive activity.

The ore deposits of the district are in shear zones in the quartz diorite, with the exception of the Drum Lummon deposits, which are in acid pegmatite dykes representing an end phase of the Coast Batholith intrusion. The Surf Inlet Mine, an important producer of gold and silver, with some copper, derives its ore from quartz veins in a shear zone, the gold being exclusively associated with irregular veins of iron pyrite within the quartz. An excellent concentrator of 300 tons daily capacity prepares this material for shipment to the smelter. There are a number of promising prospects noted, some of them being near the producing stage. A vein of unusually pure magnetite on Dean channel is described. Hot springs throughout the district were examined. Some of these are already in use for bathing purposes.

Copper Deposits on Lasqueti Island

A brief examination of this island, which lies between Texada and Vancouver islands, was made by Dr. J. D. MacKenzie. A small intrusion of quartz diorite from the Coast Batholith cuts volcanic rocks of Lower Jurassic age. In sheared and altered zones in the quartz diorite there have been formed, by replacement, shoots of chalcopyrite and pyrite carrying good values in gold and silver. Only one of these zones, on the Venus group of mineral claims, has so far furnished ore in economic quantities. The properties are in the initial stages of development.

Placer Mining in Barkerville Area

A digest of this report was given by W. H. Johnston at the annual meeting of the Canadian Institute of Mining and Metallurgy last March, and was published in the Monthly Bulletin. The possibilities of further gold production from this part of the Cariboo are clearly delineated, and there appears to be no doubt of the economic value of the gravel available there for gold dredging.

Geology of the North Thompson Valley Map Area

In this report W. L. Uglow describes the geology and economic development of a strip of land ten miles wide and 50 miles long along the Canadian National Railway north of Kamloops. The valley of the North Thompson river is cut through series of sedimentary rocks ranging from Palezoic or Pre-Cambrian age to Miocene in the Tertiary period. These rocks are flanked, both east and west, by large areas of intrusive granite, mostly beyond the limit of the map-area.

After discussing in detail the geology of the various formations, Mr. Uglow gives a vivid picture of the geological history of the North Thompson Valley. This valley dates back at least as far as the beginning of Tertiary times, when the region, after the disturbances coincident with the building of the Cordilleran range and the intrusions of the Coast Range granite, had been reduced to a peneplain. By Cretaceous times this peneplain had been elevated and the valley was eroded to a further depth of 2,000 feet. During Eocene times a depressing of the land surface signalized the deposition of the rocks of the Chu Chua series, including coal beds. Then came volcanic flows, flooding the whole valley. In Pliocene times erosion began again, resulting substantially in the present topography, which has since been altered only by the glacial scouring of the Pleistocene period and by lava flows in recent times.

The Chu Chua coal is in thin beds and the content of ash is high. It is being worked in a small way.

In the northern part of the area, there are a number of promising gold and silver-lead-zinc prospects. Comparatively little systematic prospecting or development work has been done. In conclusion, Mr. Uglow offers the following advice to prospectors:

"The southern part of the North Thompson map-area seems unfavourable for the discovery of valuable metalliferous deposits. It is too far from the seat of igneous intrusion. The northern part of the area, especially beyond the limits of the map, seems more favourable, however, and the country within a couple of miles of the contact of the Baldie batholith should be carefully prospected. A thick covering of glacial drift and a dense forest mantle very greatly enhance the difficulties of the prospector."

Lardeau Map-Area

In this brief report M. F. Bancroft tells of progress made during the season of 1921 in his mapping of the Lardeau map-area, the season's work extending southward and eastward from Revelstoke.

Sedimentary series of rock, most of these Carboniferous or pre-Carboniferous in age, have been folded and faulted, and then cut by intrusions, first basic dykes and then the same granodiorite that appears to the westward in the North Thompson Valley map-area described above.

Of the possibilities for mineral development, Mr. Bancroft says:

"The mineral deposits in Lardeau area are closely associated with igneous intrusives. Wherever there are mineral indications there are at least minor igneous bodies outcropping in the same locality. The principal intrusive contacts bordering the granodiorite areas in Lardeau are similar to contacts southward in the Selkirk region and are probably well mineralized, but for the most part these contacts cross the mountains in the remoter parts of the area and have been little prospected. Few substantial efforts have been, or are being, made to prove the value of the mineral resources of this area. At the time the Slocan area was being prospected many claims were staked at widely scattered points, and some along well-defined mineral zones in this part of the Selkirk region, yet only very limited mining developments materialized. The majority of the mineral claims are in the Slocan formation, extending diagnonally across the area between the head of Kootenay lake and Revelstoke. Some properties were located in the early days east of Albert canyon near Illecillewaet and on Incomappleux river, south of Flat creek. No important mineral discoveries have yet been made in the mountains along the south watershed of Illecillewaet river, though there are places where the rocks are impregnated with rusty-weathering sulphides, containing pyrite, pyrrhotite, and some chalcopyrite...

"...The gold quartz veins found in the central mineral belt from Cascade creek on Lardeau river through to Camborne on Incomappleux river merit investigation."

An interesting recent development is the discovery of promising deposits of crysotile asbestos near Sidmouth, on the Canadian Pacific Railway branch line to Arrow Lake. Cross fibre, rather harsh and brittle, and a good quality of slip fibre are considered to warrant serious investigation. It is suggested that talc associated with the asbestos-bearing serpentine might be of economic value.

An arrangement between the Tasmanian Government and Tasmanian producers of osmiridium was renewed on June 30th for one year. A Melbourne firm is authorized to dispose of the metal. All production is pooled. Sixty per cent. of parity price is paid when the metal is received by the agents, the balance when sales are completed.

The Late Gardner F. Williams

DEAN OF THE DIAMOND FACULTY

By ALEXANDER GRAY

Gardner F. Wiliams was a kindly autocrat. During his regime he ruled Diamondom with that rare discretion and ability which made him guide, philosopher and friend to the Rothschilds, Cecil John Rhodes, Alfred Beit, Julius Wernher, C. D. Rudd, Barnato, the Joels, and all of those under whose aegis diamonds and gold to the value of billions were produced.

"The Chief" was Kimberley, and Kimberley was "the Chief"; the average resident of Diamondopolis never regretted the fact unless there was cause for it. Then there was either geniality or inflexibility.

With or without the counsel or concurrence of his Directorate, the word of Mr. Williams was the Law. That was how DeBeers Consolidated operations attained to a degree of perfection that carried its own commendation, and that is why his son, Alpheus F. Williams, came to succeed him as General Manager of the greatest factor in the Diamond World. In the Williams' lexicon "dud" was eliminated. He drafted youth and brains for DeBeers—and when his staff invariably was given preferment by other Mining Masters he recruited other virile aids with more gray matter.

To have served under him was a Degree. From his Technical School graduated many of those who won distinction throughout the Mineral Industries. If Kimberley was *imperium in imperio*, Mr. Williams was the same within that organization which ramified throughout the Diamond and Gold Fields. He preceded Hammond, the Jennings, Webb, Yeatman, Webber, the elder Mein, Clement and their contemporaries. Even after all these had withdrawn from South Africa, he continued to execute the policies of Rhodes, Rudd, Beit, Porges, Jameson and Barnato until crowding years and a tragedy suggested the surrender of his baton to his son.

From the "most splendid winding engine", which Rhodes wrote he had shipped, to power plants designed and fabricated on the spot or modelled elsewhere after the most efficient, Mr. Williams was the Executive throughout. Mining practice was revolutionized. Whatever Mechanical Sciences could devise was adopted. At surface and underground the Diamond Industry was filmed daily while Diamond Markets and the Cutting Trades catered to the fancies of the fair sex.

Perhaps the greatest tribute that could be paid to Mr. Williams was that things moved almost automatically. That was the consummation of the efforts of Gardner Williams, which the hearty co-operation of his Board, notably Colonel Harris, after Rhodes and Jameson were gathered to their fathers. Before DeBeers could move with this rhythm many millions of loads of blue ground and of money had come from mines that have made prosaic the fables of the Arabian Nights. Williams' method, as adhered to from working face to the first valuator, left nothing exposed to the off chance of losses in recovery.

Not only Diamond Mines, new diamond discoveries, coal mines, power developments, explosive works, came within the Williams purview. DeBeers also administered Kimberley as a municipality, and there again there was system; for business rivalries were obviated by the limited number of licenses obtainable from the local Chamber of Commerce. Yet the Diamond Metropolis is a large trade center, with all the attributes of such. Preventive within and without DeBeers, the necessity for compounding natives and for imposing every possible safeguard against the theft of diamonds, made imperative a close corporation. Withal, Mr. Williams was as firm and as lenient as varying conditions warranted.

A propos of the assumption that DeBeers could run by itself, while this was complimentary to the Wiliamses, the uninformed will not appreciate that it hardly conveys an adequate idea of how operations were conducted from the almost chaotic stage to what was urged as an ideal situation. Every advance in the scientific mining and recovery of diamonds for forty years bore the sign manual of that veteran graduate of Ann Arbor who guided the evolution of Kimberley from the paroxysms of individual diggers deluged with caving rock in millions of tons from the rims of the craters, to the pulsator that mechanically caught the gems upon greased terraces, thereby terminating the cumbrous and inefficient practice of hand-sorting the concentrates. Aerial gears and rawhide buckets were wondrous in their way. Batteries of rotating washing machines superseded the whim and the horse-propelled pan.

In the glamorous diffused lights, however radiant, revealing those Diamond Mines as they are, few survive who can focus the initial tribulations that confronted Mr. Williams and his principals. Forty years ago, when the Kimberley Mine open workings were at a depth of four hundred feet, in order to haul out one million loads of blue ground during the year, three million loads of reef fallen in from the terraced rims had to be raised. Two years later 250,000 cubic yards of shale slid across half the Kimberley Mine. After about four million cubic yards of reef had been removed from buried claims, at a cost of £2,000,000, it became obvious to Rhodes and his associates, and to Mr. Williams as their Engineer, that engineering science and capital in combination must be applied, not alone at the Kimberley Mine, but at all the other mines. At the DeBeers Mine smaller rock slides culminated when nearly five million cubic feet tumbled onto claims.

For seven years, ending with 1887, Messrs. Rhodes and Rudd vainly endeavored to purchase control of the DeBeers Mine. They decided at one period they could not raise £6,000 to accomplish that. When conflicting interests there and elsewhere were adjusted, the Rothschilds, on the say so of Mr. Williams and Hamilton Smith, let Mr. Rhodes have £1,000,000 to assist him in financing the consolidation which now dominates the Diamond industry.

Prior to the Consolidation, 911,706 loads of blue ground had been washed and the production therefrom was valued at £901,818,013. To 1901, 50,811,311 loads of blue ground, debris, tailings and old concentrates had been washed, and the value of the diamonds so produced was fixed at £50,148,759.

In the years intervening and until now DeBeers has become mightier.

The record, though incomplete, may well serve as an epitaph.

The Chairman of the Zinc Corporation, Mr. E. V. Corbett, has stated that Broken Hill (New South Wales) lead must hereafter be produced at less than £20 per ton if the industry is to be successfully maintained.

News of Mining

Great Britain

A typical instance of the increase of railway freight rates in coal in Great Britain was given recently in the House of Commons. In 1914 the rate per ton from Rotherham to London was 6s. 11d. It is now 10s. 5d. per ton.

The British Mines Department has issued a statement showing that for the first quarter of the current calendar year the total coal raised was 57,633,631 tons. Of this amount there was used at the mines 3,957,505 tons, and 1,462,795 tons provided for the use of miners. The commercially disposable balance was 52,213,331 tons. The total cost per ton was 19s. 9.66d. Wages make up 13s. 4.08d. of this. The output per man shift worked, was 18.23 cwt. the earnings per man-shift worked, 11s. 0.18d.

By a new order issued by the Secretary of Mines, the ingredients of the permitted explosive Ammonite No. 1., are to be used in the following parts by weight:—Nitrate of ammonium, not more than 77, nor less than 73; trinitro-naphthaline, not more than 6, nor less than 4; chloride of sodium, not more than 21.5, nor less than 19.5; moisture, not more than one. The container required is a lead and tin alloy waterproofed with pure paraffin wax.

Great Britain's exports of coal for the month of June totalled 4,793,648 tons, as against 5,057,237 tons during May. France was the largest buyer, taking 982,071 tons; Germany next with 889,644 tons.

The eighth annual general meeting of the Mond Nickel Company, Limited, was held recently in London, England. Announcement was made by the Chairman, Mr. Robert Mond, J.P., that the Company had acquired control of Henry Wiggin and Co., Limited, in order to develop new markets for nickel and nickel products. The Company has also interested itself in the organization of the American Nickel Corporation of Clearfield, Pa., for the manufacture of malleable nickel. The Corporation will also handle sales of the Mond Company's raw nickel in the United States. The market for copper sulphate was reported as excellent in tonnage but hardly up to the mark in prices current.

United States

The Bureau of the Census has issued its report on "Iron ore," as part of the Fourteenth Census of the United States (1919). From this publication it appears that the per capita output of iron ore in the year 1879 was 0.13 ton for a population of 50 millions. This went up to 0.56 ton for a population of 92 millions in the 1909, and to 0.58 ton for a population of 106 millions in the year 1919. Minnesota and Michigan are the leading producers among the different states. In the year 1901 Minnesota attained pre-eminence over Michigan and has held it by large margins ever since. Alabama comes third, with New York fourth. Pennsylvania lost the leadership to Michigan early in the eighties.

The annual report of the Alaska Treadwell and its associated enterprises, the Alaska United and Alaska Mexican gold mining companies, for the year 1921, shows receipts of $217,495.85 and expenditures of $240,039.79.

The construction of a branch railway to the Healey Coal fields of Alaska has been sanctioned by the United States Secretary of the Interior.

The managing director of the American Gold and Silver Institute estimates that silver purchases under the Pittman Act will last for about fifteen months from the present.

Europe

French collieries wrecked during the war produced 1,348,913 tons of coal during 1921. The 1913 output was 2,512,340 tons; and for 1920, 586,005 tons. About 13,000 men are now employed as compared with 10,179 in 1913.

Low-temperature carbonization processes are now playing an important part in German industry. The meagre supplies of gasoline and lubricating oils have been greatly augmented by the treatment of lignites, shales and in lesser degree, bituminous coals.

According to the conjoint report of two mining engineers employed by the Spanish Government, there are at least seven deposits of iron ore in the province of Granada that can be profitably worked. The tonnage presently available at each property ranges from 9,000 tons to 125,000 tons. Costs of production are estimated at from 2.50 pes. to 3.25 pes. per ton; transportation costs at from 12 pes. to 15.25 pes. per ton; average iron content from 51 per cent to 66.8 per cent.

South Africa

In the year 1913, coal mining costs in South Africa, including only the three major items of white wages, native wages and stores, averaged 2s. 11.74d. per ton. In 1920 this average went up to 4s. 10.24d. per ton, and in 1921 to 5s. 10.40d. per ton. Only 13 companies out of a total of 39 paid dividends in 1921. The sales of coal are controlled and allocated by the Transvaal Coal Owners' Association, the cost of selling and administration being only ¾d. per ton.

Before the recent strike, mining and milling costs at the Robinson Deep stood at 26s. 6d. per ton. Costs are now being satisfactorily reduced. The loss for the first quarter of the current year was £47,000, due to suspension of work. It is expected that the rate of crushing will shortly be brought up to 700,000 tons per annum. As the gold recovery will average 26 shillings per ton, profits will absolutely depend upon cost reduction. 20 shillings per ton is the figure aimed at.

Rhodesia's gold output for the month of June was 55,614 ounces; silver, 14,745 ounces; chrome ore, 300 tons; asbestos, 1,069 tons, and diamonds, 16 carats. The outptut of coal exceeded 39,000 tons.

Working costs at the Modder "B" were reduced by 10d. per ton during April. They stood at 25s. 2d. per ton, as against 26s. for the year 1921.

The Director of Native Labour, Colonel S. M. Pritchard, has suggested that mining work be classified as skilled, semi-skilled, and unskilled. The category of skilled would embrace all occupations for which apprenticeships had been served, and all requiring special intelligence or training. Semi-skilled occupations would be merely a lower class of the former. He contended that native wages could not possibly be increased unless their wage-earning capacity were increased.

Out of 35 leading Rand gold mines, 15 showed lowered working costs for the month of June.

Australasia

The reorganized Broken Hill Junction Lead Mining Company's first annual report—February 1921 to the end of March 1922,—shows that maintenance of the mine and plant through the long periods of idleness cost the company £10,908. Considerable additions, however, were made to the ore reserves, which will partly compensate the Company for this loss.

The Mining Districts

FROM THE JOURNAL'S CORRESPONDENTS

BRITISH COLUMBIA

To Discuss the B. C. Iron and Steel Industry

The arrangement of finances in connection with the establishment of an Iron and Steel Industry in British Columbia is to be discussed, according to report, in London. Hon W. S. Fielding, Minister of Finance, has left for the Old Country and is said to be prepared to take up this question. The Imperial Trade Facilities Committee is quoted as saying that four million dollars of its funds is available for the western Canadian enterprise. There is a possibility that a member of the British Columbia Government will go to England in connection with this matter.

Premier Offer to B. C. Silver

An offer was made by the Premier Gold Mining Co. last June of $1,000,000 for the option to purchase within a two year period the 60% interest held by the Selukwe Gold Mining & Finance Co. of London in the B. C. Silver Mines, Ltd. The Premier Company submitted also that if the Selukwe people would extend the time of the proposed option the bond price would be increased. In reply the Selukwe representatives suggested a price of $5,000,000 to be paid over a period of four years. Mr. Guess, acting for the Premier Company, declined to consider this proposal. It will be recalled that the Premier Company some months ago paid $100,000 for the 40% interest now held by them in the B. C. Silver Mines, Ltd. which property is believed to contain a continuance of the Premier lead.

High Grade Ore at Fish Creek, Alaska

The property of the Fish Creek Mining Co., recently reported to have been absorbed by the American Mining & Milling Co. consists of some 19 claims situated on the Alaskan side of the line close to the Portland Canal Mining Division of British Columbia. It is about one mile by air line from the Salmon River wagon road, and within five miles of tidewater at Hyder, Alaska. Owing to its low elevation, ample timber and water power are available. There has been considerable development work done in the way of tunnelling, stripping, etc. From what sampling has been carried out, the ore would seem to run consistently high gold and silver. One return gives gold $28., silver 493.6 ozs., or a total value per ton with silver at American prices of about $521.60.

Custom Office for Portland Canal

Indicative of the growing importance of the Portland Canal Mining section, B.C., is the announcement that a Canadian Customs office is to be established at the International boundary opposite the U. S. Customs office already established there. This is for the purpose of facilitating the transport of supplies and material for Canadian mines in the district, as practically all this material must cross Alaskan territory. It is considered likely too, that an aerial station will be installed at the town of Stewart.

Prospectors' Supplies by Hydroplane to Prospective Placer Field

Some excitement was occasioned recently at Hazelton, B. C., Grand Trunk Pacific Railway, by the departure of an hydroplane carrying 1500 lbs. of supplies for prospectors in the field in a little-traversed section of northern British Columbia. The plane reached Thindade Lake without mishap and made connection with the party. An hour was spent in scouting over new country and the crew of the plane report having seen large herds of caribou and goat and some moose. Thindade Lake is at the head of Finlay River and in the past has been reached by pack train, the round trip taking from 5 to 6 weeks. It is reported that a new mining field of importance is likely to be staked as a result of these activities.

Ore Receipts at Trail

Ore receipts at the Trail Smelter, Canadian Consolidated Mining & Smelting Co. for the week ending August 14th, aggregated 6,936 tons, of which 6,324 tons were from Company mines. Of the balance, apart from Washington State mine, the largest shippers were Rosebery Surprise, 84 tons; Whitewater, 70 tons; and Paradise, 54 tons.

Engineer Mine Still in the Courts

The ownership of the Engineer mine, Atlin, B. C., upon which has been placed a valuation of $3,000,000, is to be decided by the Privy Council. The issue is between the executors of the estate of the late Capt. Alexander and the Engineer Mining Co. Members of the latter Company claim that they were the original locators and improvers of the property, and that while their application for a certificate of improvements was held up in the registers, Captain Alexander staked over their property. Both before the Supreme Court and the Court of Appeal the Engineer Mining Co. have lost their suit, but they are making an appeal to the highest Court in the Empire. Meanwhile the further development of this well known and rich gold property is held in abeyance.

Canada Copper Reorganization

Apropos of the reorganization of the Canada Copper Co. Ltd., it is understood that shareholders and bond holders have received circulars outlining the plan decided upon. This contemplates the foreclosure of the first mortgage and the forming of a new company to acquire the properties covered by the mortgage. The monies raised by the new company will be used to begin operation and for working capital, such monies to be raised by the sale of stock at $5.00 per share. For each 11 shares of stock owned the holders must subscribe to 1 share of stock of the new company at $5.00 per share, and shareholders owning less than 11 shares of stock of the new company. Stockholders who do not subscribe receive nothing.

Coal Strike Settlement

The coal miners' strike in District 18, U. M. W. of A. (which includes eastern British Columbia and the Province of Alberta) is likely to be settled immediately. The prospects of an adjustment that will result in the miners returning to work after having been idle practically all summer were bright at the time of writing (August 22nd). It is suggested that the mines will be re-opened in the Crow's Nest Pass next week. The miners recently made an offer to restart on the basis of a 20% reduction, provided that other conditions remain as at 31st March last. The

operators then refused to consider this, but it now is believed that they have agreed to such a settlement the same to obtain until the 31st of March, 1923. There is a general feeling that the proposal will meet with the approval of the men, and that all that stands in the way of a settlement is the necessity of obtaining the endorsement of the men through the ballot.

Vancouver Island Coal Seam on Mainland?

There have been reports recently that the coal seams outcropping on Vancouver Island in the Nanaimo district extend under the Gulf of Georgia to the mainland, and may be located under English Bay near Vancouver, B. C. and at different points in that section. As a result the Provincial Government is receiving applications for coal rights on lands, surface and subterranean, extending over a considerable part of the southern mainland coast of the Province.

Chu Chua Coal

The Wiggan Collieries at Chu Chua, near Kamloops, B. C. expect to be producing 500 tons of bituminous coal a day by the first of next year. Development by means of diamond drilling now is in progress.

Coal Mine for Okanagan

The White Lake Collieries near Okanagan Falls are planning the production of 100 tons a day of semi-anthracite coal. A ready market for this will be found in the well settled agricultural area of the Okanagan Valley.

The Vancouver Island Coal Mines

The coal mines of Vancouver Island continue to be exceptionally active. Not only is the domestic demand heavy, but foreign trade has improved and the operators' only problem is to mine sufficient coal to supply the trade offering.

The production of the Western Fuel Corporation, Nanaimo for the month of July broke all records. The total of 76,395 tons being the largest in the history of the company. The closest approach to this figure was 69,500 tons in March, 1918. Not only is the output for July a record for Nanaimo mines, but it is the greatest production for a month of any Island colliery. As there were 25 working days in that period the average daily output was over 3000 tons.

The Western Fuel Corporation of Canada now has in its employ 1675 men, and while conditions at the present time are abnormally good, the management does not anticipate any decided slump in the future. It is likely that the scope of its activities will be enlarged, and with this in view new fields in the vicinity of Departure Bay are being explored. It is probable that at least one new shaft will be sunk before long.

What has been said regarding the Nanaimo Company applies also to the Canadian Collieries (D) Ltd., whose production for the month of July runs very close to 68,000 tons. The Granby Consolidated Mining & Smelting Co. has been speeding up the output of its collieries at Cassidy, a total of over 20,000 tons for the month of July marking a substantial increase.

Canadian Collieries (D) Ltd. is encouraging its employees to lay out gardens and otherwise beautify the surroundings of their homes at Comox, South Wellington and Extension. Prizes have been offered of $25 for each best garden in each town a further prize of $75 for the best garden of all. The judges will not only take into account the matter of floral beauty but will be required to give proper consideration to those who go in more for the utility end of cultivation by the production of vegetables, etc.

SPECIAL DISPATCH FROM SUDBURY!

Sudbury Citizen: Well, I guess we can't have a coal field here. Too bad you haven't any fossils.

Bill McVittie: I've seen fossils out at my mine.

Sudbury Citizen: The hell you have! What fossils did you see?

Bill McVittie: I saw the Palaeozoic millerite, the Pleistocene colemanite, the Pre-Cambrian nightite and some vermiform varieties which are now in the Geological Museum at Ottawa.

Sudbury Citizen: That takes the coyne!

A GREAT INVESTMENT OFFER

(From *Journal of Commerce*)

Last issue we referred to the statement issued by the Minister of Finance relative to the Government loan operations, and, in commenting editorially thereon, we expressed unqualified approval of the conversion scheme announced therein. Elsewhere in this issue will be found the official advertisement of the scheme in question, and, from a perusal of this, it must be apparent to all that the holders of the Canadian Government war loan bonds, about to mature on the 1st of December next, have a splendid opportunity for reinvestment open to them.

For the ordinary investor, the first thing to be sought in an investment is that it should be absolutely safe. The only people who, without an uneasy mind, can afford to go in for speculation and take the risks attendant on speculative enterprises, are the really rich, and the really rich are relatively few in number. The rest of us—the great majority—whose means are moderate, must, if we are wise, make it a *sine qua non* of our investments that they be absolutely secure. And it would be difficult, anywhere in the world today, to find more absolute security than that offered by the bonds of the Dominion of Canada.

Further, in addition to the absolute security they offer, the bonds which the holders of those about to mature can exchange for the latter carry the same high rate of interest, namely 5½ per cent., and are either for five years, maturing in 1927, or for ten years, maturing in 1932, as the bondholder may prefer. Without hesitation, we say that we know of no other investment, taking so high a rank, that combines, to the same extent, unimpeachable security with liberal interest. Moreover, as we pointed out last week, a further substantial advantage to the bondholder who takes advantage of this conversion scheme is that he will receive a bonus of one month's interest.

The present offer is not made to investors generally, but only to the holders of the bonds about to mature. Holders who do not wish to reinvest in the manner open to them through the conversion scheme will be paid in cash on the 1st of December. But the security offered to them is so gilt edged and the rate of interest so generous that we shall be very greatly surprised if the great bulk of the maturing loan is not eagerly renewed by those who have the chance offered to them.

EDITORIAL

We hear a great deal of what heated waters and volcanic action have accomplished in the formation of ore deposits; but no one has yet come forward to champion the glaciers, to whose action in many parts of the world the mineral industry is much indebted. — W. G. Miller. — 1904.

A CENTURY MARK IN ASBESTOS

During this year the production of asbestos from the Thetford region of Quebec will reach and pass the hundred million dollar mark. From a very small beginning in 1878, when asbestos was first shipped out on the brand-new railway, the industry has grown slowly and steadily until today it constitutes the major part of Quebec's mining industry and one of the most important units in the mineral production of our Dominion.

At what stage in its development our asbestos industry now stands, it is difficult to judge. As pointed out recently in these columns the reserve of ore definitely determined at least equals the total extracted to this date. On some properties no attempt has been made to block out ore reserves and on none of them have the limits of the productive ground been reached. Consequently it can be concluded safely that the present century mark will be more than doubled before there is the slightest danger of exhausting the deposits. How many times this will be repeated is pure conjecture.

Another satisfactory feature of the present asbestos production of Quebec is the high price the mineral brings. A great deal of what was sold to make up the present total of one hundred millions brought only a mere fraction of the present prices per pound or ton. It seems likely that the unique quality of Quebec asbestos will cause it to continue at the present enhanced value as compared with the more brittle fibres from other countries.

The Quebec asbestos industry now has what very few mining camps possess—the dignity of years, combined with an unabated production and the promise of an indefinitely long life of usefulness. Its present age can be aptly gauged by a personal experience that befell one of our veteran Canadian geologists, Mr. R. G. McConnell, the recently retired director of the Geological Survey. In the summer of 1877 Mr. McConnell then a young student assistant on the survey party that was pushing through the location of the Quebec Central Railway was camped on the shore of Black Lake. Then, as now, that hilly region was subject to sudden and violent storms. The young McConnell was flooded out of his tent and doubtless marked the district unfavorably on that score. Since then the country-side has, no doubt, redeemed itself even in the eyes of Mr. McConnell.

During the course of the asbestos industry's long life in this country, little has been done to ensure its manufacture within our borders. This anomalous condition is now rapidly being changed, mainly on account of the high tariff in operation, and the still higher tariff pending, in the United States as well as by virtue of preferential tariffs within the British Empire. How far these conditions and the natural ambition of Canadians to make the most of this natural resource will carry the movement, it is impossible to say. Meantime we may be well satisfied with the steady annual creation of wealth by the mines, and the good beginning that has been made in the domestic manufacture of asbestos products.

OUR MAPS

During the past year there has been concluded in Ottawa a measure of inter-departmental co-operation that has passed unnoticed by the public. It is of interest to the mining industry, and deserves mention here.

There are three departments of our Federal Government that have to do with map-making—the Geological Survey, the Militia Department and the Topographical Surveys Branch of the Department of the Interior. All three of these have field parties at work each season, and all publish maps that are widely used not only in Canada but abroad. Until this year each of these departments followed its own sweet will in map making, with only the vaguest reference to its two sister departments. The result was a great deal of unnecessary duplication both in field work and in the compilation and printing of maps, as well as a lack of uniformity in methods both of recording information and of printing maps that made inter-departmental co-operation extremely difficult, even had it been desired. Happily this anomalous state of affairs has come to an end. The three departments concerned have agreed upon a common course of action that will avoid duplication of effort and will ensure a far better return for the total annual sum spent on map-making.

The geodetic survey provides, of course, the basis for all permanent mapping. The settled portions of the country are now fairly well provided with the necessary determined points of reference, but in our outposts of the art of precise surveying. In the [illegible] of the various provinces control surveys of a temporary nature—

are now provided well ahead of the detailed exploration that depends to such an extent upon a reliable framework of surveyed points. Northern Quebec alone is, we are sorry to say, deficient in these control surveys, with the consequence that the existing maps are mainly of that very sketchy sort that aggravate the explorer and prospector more than they assist him.

Filling in the space between the high spots touched by the geodetic survey, we have maps made by all three departments. The Militia Department, with an eye to national defence, makes the ordnance maps that are a necessity for systematic military operations. Their detail and accuracy, though not yet comparable with those of maps in older countries, are notable in Canadian map making. These maps cover as yet only part of the settled fringes of our country, and the work proceeds but slowly. The Department of the Interior publishes useful maps on various scales, notable among these the standard geographic sheets on a scale of 1 500,000 and 1 250,000, (approximately eight and four miles to the inch, respectively). The information for these is gathered principally from the records of land surveys, provincial and federal. The Geological Survey's maps vary from the mere sketches provided by pioneer explorers to the extremely accurate contoured maps made of important mining regions. The standard map, though, is on a scale of a mile to the inch, giving accurate topographic as well as geological data. It is from a series of contiguous map sheets of the last variety that the final and complete geological maps of Canada will be compiled —a compilation that is as yet only a vision in the future, but toward which our far-seeing geologists are already beginning to shape their course.

Map-making is a science, as well as an art. Only the initiate can realize fully the wealth of information recorded on even a simple map-sheet. Particularly does the geological map deceive one by its apparent simplicity of construction. A life-time of well-spent geological effort can be recorded in the few colours and symbols of a comparatively small geological sheet. Happy is the man who is thus privileged to make and leave a record for the guidance, not only of contemporary co-workers, but of Canadians of future generations. To those with eyes to see, there is no record that demonstrates faithful and discerning human effort more clearly than a well-made map.

THE MINE EXPLOSION ON VANCOUVER ISLAND

We have received from our British Columbia correspondent the following telegram—"Explosion in number "4 Mine, Cumberland, Canadian Collieries (D), Ltd. "Fifteen fatalities, three white men and remainder "Orientals. Special investigation ordered by Minister "of Mines. Cause of ignition unknown. Electric lamps "were in use in affected area, and no blasting was per-"mitted."

Thus there is recorded briefly one of those accidents for which the coal miner always be prepared, for the prevention of which all the resources at his command at times prove unavailing. The coal miner in Canada is now protected about as securely as can be by a well-framed law and a conscientious enforcement of its provisions. In spite of this, accidents occur periodically to remind us of the danger of working in a gas-or dust-laden atmosphere in a chamber in the bowels of the earth.

In this case, the effect of the explosion has apparently been localised by means of the precautions that are now exercised in every well-managed coal mine. The loss of 15 human lives is to be deeply regretted, and all means must, and will, be exerted to prevent a recurrence of the tragedy; but advances in the science of coal mining have prevented the holocaust that used to mark an explosion in a gassy mine.

FURTHER EXPLORATION AT ELBOW LAKE

It is satisfactory to note that exploration work is to be resumed on the Elbow Lake claims in Northern Manitoba, formerly under option to Mr. Noah Timmins and some associates. The spectacular surface showing of gold that first attracted the attention of the Murray brothers failed of its promise, as most spectacular showings do. Mr. Timmins dropped his option on the claims, not necessarily because he considered that there was insufficient ore available there to form a basis for profitable mining operations, but because the ore his work of exploration disclosed was insufficient to warrant the payment of the further sums specified in his option. It is reasonable to suppose that Mr. Timmins is searching for a second Hollinger, and is interested neither in a little mine nor in a long chance on a big one.

The terms under which the further exploration on the Elbow Lake claims is to be conducted are radically different from those recently terminated. The terms accorded to Mr. Timmins assumed the possibility of a large ore-body, unusually rich in gold, and specified cash payments of very large dimensions. The new agreement, as reported, provides plenty of money for development work, but restricts the reward of the owners of the claims to a participation in whatever net proceeds there may be eventually from the operation of the property. This is a very reasonable basis of agreement in such a case, and if it were adopted by more prospectors, it would be much easier to find investors to open up mining claims. We hope that in this case the Messrs. Murray have already received payments on their claims sufficient to reimburse them for the expenditure of time and energy that resulted in their discovery. This much cash at least is due the prospector as a reward for locating a good "showing", and is pre-requisite to further prospecting.

Whether or not Elbow Lake will have producing mines, is still undetermined. The rational means now adopted to determine the point are worthy of remark. The operators have our best wishes for success.

EDITORIAL NOTES

In his addresses to the electors of The Pas district in Northern Manitoba, previous to the by-election there in which he is a candidate, Premier Bracken has stressed the importance to the farmers of the province of a well-developed mineral region in their hinterland. He is evidently one among the very few practical politicians who are well seized of this intimate relation between the two great prime producers of our country. We shall follow with interest the practical means that Mr. Bracken and his Government will adopt to put his promises into effect.

The largest of our Canadian mining and metallurgical corporations has at last resumed operations on a comprehensive scale. The International Nickel Company has re-opened its smelting plant at Copper Cliff, and will operate at one-third total capacity for the time being. This foreshadows also the resumption of mining operations at an early date. Meantime the refinery at Port Colborne has been operating steadily for some time. That the peace-time market for nickel, not yet returned to its full dimensions, already warrants the resumption of activities at Copper Cliff, speaks well for the future of the nickel industry. It has passed through dark days, but the future is bright with promise, already partly fulfilled.

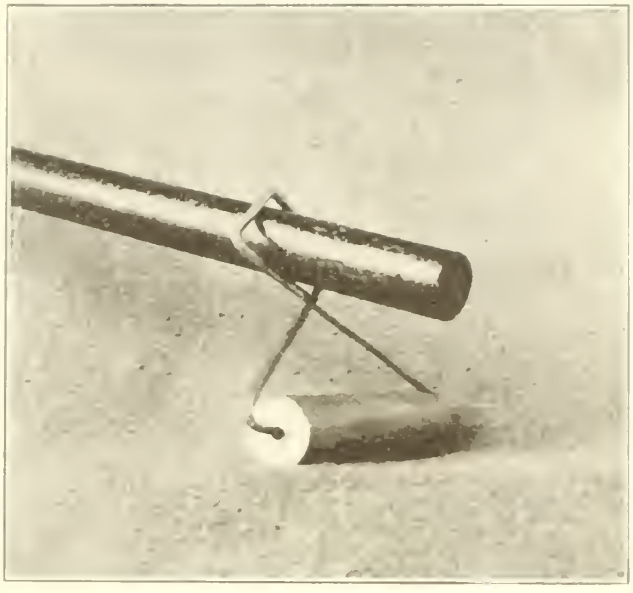
This week's budget from our Nova Scotia correspondent, who is a keen student of labour affairs in Cape Breton, is full of hope for the future. As has been pointed out repeatedly in these pages, the responsible officials of the Dominion Coal Company have displayed throughout the long period of dispute a toleration and a respect for the undoubted rights of their miners that are well worthy of remark. That they adopted this attitude of regard for justice and recognized throughout the practical necessity for compromise was all the more commendable because of the provocative attitude of the ill advised miners' leaders of radical tendency. It says much for the essential soundness of the miners themselves that the power of these false leaders is now distinctly on the wane. Once more it has been clearly demonstrated that "red" tactics are not acceptable to Canadians and that Sovietism will not become part of our political organization.

In response to our editorial of June 20th, entitled "Newspapers and Mining News," we have received a communication from "Science Service," in Washington. This is an organization for the collection of news of scientific interest and its supply to the public press. Its board of trustees is graced by a long list of scientific men in prominent positions, who are available for consultation. The motto of Science Service is "Not *Interesting, If True*, but *Interesting And True*." This is a move in the right direction. Truth is stranger than fiction, and far more interesting. Let us have the truth.

A ROLLER FOR LONG BARS

(Harry Moore, Montreal)

Where no proper facilities are provided, it is a common sight to see men dragging long bars of steel over the shop floor, cutting ugly grooves in the latter and incidentally giving themselves much needless exertion. One man who had work of this kind to do from time to time, made the simple little roller shown in the photo. The roller itself is a piece of scrap steel with a hole in the center, through which passes a length of quarter inch wire bent to form a Vee square as it were. The end of the round bar is inserted in this, and when the



workman pulls at the other end, the wire grips the bar tightly between the Vees, thus holding it to the roller and keeping it square at the same time. Various size bars can be handled with this device, those that are too big to go through the wire requiring the service of more than one man to transport them successfully.

REQUIEM

And the strong man wept, wept sore,
As he gazed upon the floor;
And his tongue was mute and tied,
He exuded shattered pride
But at length his speech returned,
Whilst his eyes with anger burned;
And he said, with gesture fistic
"Do you call this job artistic"
"This prospectus is a frost;
"Fifty bucks is all it cost;
"This will put us on the blink!
"What will other people think"

So from a treasury, wasted and depleted,
They got a grand super prospectus completed
(You *may* think it odd, or you *may* think it not,
But that's everything that the shareholders got.)

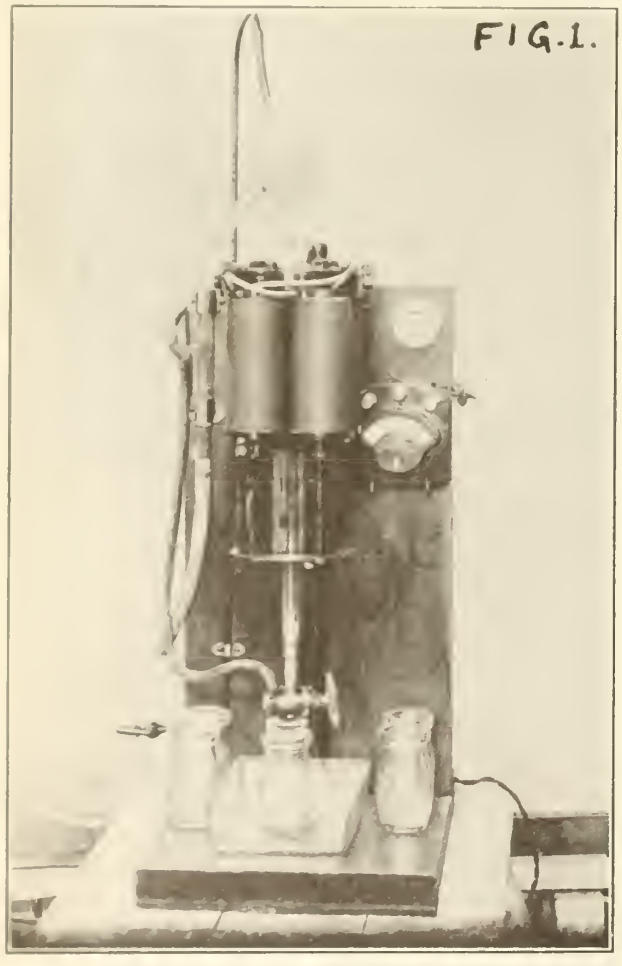
ANON.

An Apparatus for Magnetic Assays

By F. C. DYER

The determination of the amount of magnetic material (magnetite or pyrrhotite) in an ore is frequently required. With coarse magnetic particles the determination is simple, but when, as is often the case, the ore requires to be ground very fine (below 200 mesh) to liberate the magnetic particles, then the determination is more difficult. It is almost impossible to make a determination dry, and to make it wet, by hand, is a slow and tedious process.

To render the wet determination of the magnetic portion of an ore both easy and expeditious the machine described below was designed and built, and has proved very satisfactory.



The principle employed is to suspend the magnetic particles in an alternating and rotating magnetic field through which flows a stream of water.

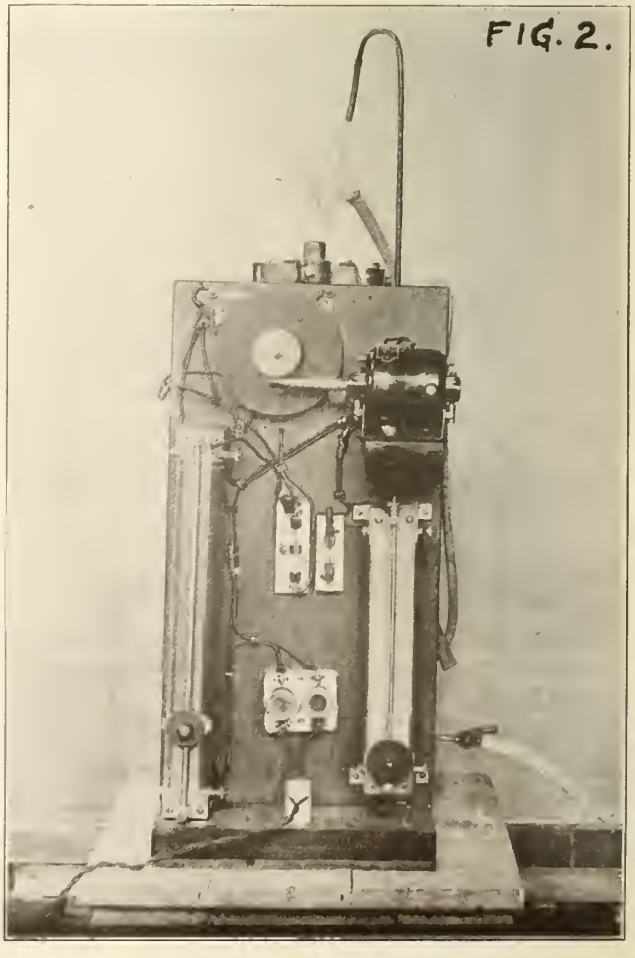
The washing chamber is a glass tube about 3-4 inch in diameter, with a receiving funnel and water overflow at the top, and a glass stopcock at the bottom. It is fitted into a small flask with an overflow sufficiently high to keep the water level in the tube near the top.

Around the tube is an iron ring from which are hung four electro-magnets wound with 3500 turns of No.14 D. C. C. wire. The magnets are coupled in pairs alternately so that the magnetic field of each pair is along a diameter of the tube. The pole pieces are 4 in. by 2 in. by 1 in., bolted to the magnet cores and slotted at the back for adjustment, and are wedge-shaped toward the central tube. Two notches 3-4 in. by ½ in. are cut in the wedge of each pole piece. Without these notches or with notches too small the magnetic particles will slide down through the field, overload the end and drop off. The remaining parts of the poles, about 1 inch long, have a capacity of over one gram of magnetite each, making a capacity of more than three grams of magnetite for the machine, which is ample for any ordinary determination.

The electro magnets are operated by a rotating commutator which alternates the fields of the magnets and also their polarity, causing vigorous stirring of the magnetic particles suspended in the field. There is a slight lap in the commutator so that the current is turned on one pair of magnets before it is shut off the other pair. The magnetic field is therefore not lost during the change.

The commutator is revolved at from 50 to 100 r.p.m. by a gear and worm operated by a small series-wound motor with a suitable resistance for connection to a 110 volt circuit. By means of the resistance the speed of the motor may be changed if desired.

The magnets are coupled in parallel with a 50-ohm rheostat by means of which the currents to the magnets are controlled, and varied from 1 amp. to nothing. As the magnet coils become warm their resistance increases with decrease of strength. At the same time the rheostat also is becoming warm, tending to increase the current to the magnets. These changes are partially compensatory. By means of an ammeter and a slide on the



rheostat, current strengths can be controlled, so that conditions can be duplicated and the amount of middling retained in the field controlled to some predetermined degree. A double-throw switch permits the ammeter to be short circuited when it is not required. A switch is provided to stop the motor when readings are required, otherwise the needle oscillations may be so violent as to make meter readings impossible.

Except for reading the ammeter, these switches are not used, but a master switch, placed on the front of the machine throws in or out both motor and magnets together; thus there is little danger of trying to operate the machine without the magnet current being on.

The machine is provided with an adjustable water jet serving to wash the ore into the machine and also to provide a constant stream of washing water through the tube.

In operation the stopcock is opened, the machine filled with water, and the wash water and current turned on. The weighed and wetted ore is washed into the funnel and tube. In a minute or two the magnetite is washed, the water in the tube becoming clear. The stopcock is then closed, the bottom flask removed and replaced by a beaker. The current is shut off and the stopcock opened, the magnetite washing into the beaker. A fresh flask of water is placed in position and the machine is ready for another round of operations.

As a matter of precaution it may be advisable to return the material in the flask to the machine. Any fine particles of magnetite that escaped will be agglomerated and caught in the flask, and it is only a minute's work to re-treat the small amount of material caught in the flask. The time taken to do the whole operation, except the drying and weighing, is only three or four minutes.

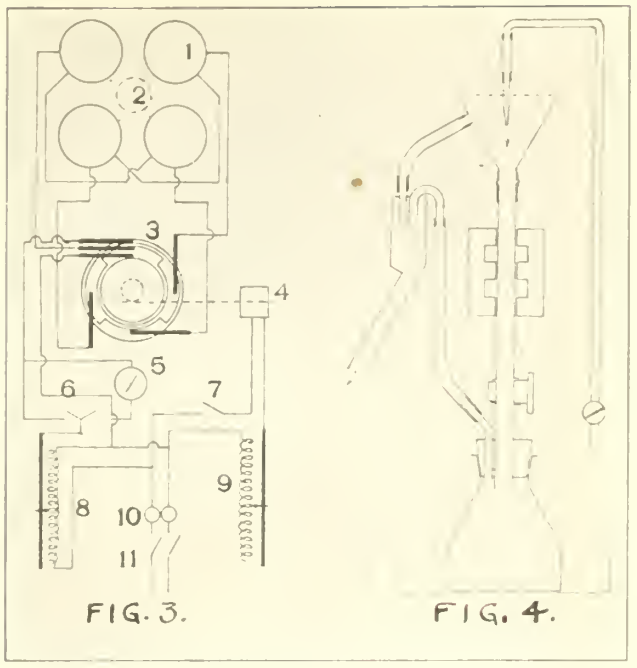


FIG. 3.

FIG. 4.

Figure 1 is the machine from the front, Figure 2 is the back of the machine. Figure 3 is a wiring diagram, in which 1 is the electro magnets, 2, the magnetic field, 3, rotating commutator, 4, motor, 5, ammeter 6, ammeter switch, 7 motor switch, 8, magnet resistance 9, motor resistance, 10, fuses, and 11, the main working switch. Figure 4 is a diagram of the water circuit.

University of Toronto, July, 1922.

AMERICAN ELECTROCHEMICAL SOCIETY

Meeting in Montreal, September 21, 22 and 23, 1922

Final arrangements for the Forty Second General Meeting of the American Electrochemical Society, at Montreal, Que., are being made which will make this meeting one of the best in the history of the Society.

The meeting will be opened by President Schlueder berg on Thursday morning (September 21) and the Technical program will proceed with the presentation and discussion of papers on Electrolysis and Electroplating. The recently organized Division on Electrodeposition (G. B. Hogaboom, Chairman; Wm. Blum, Secretary) will be well represented and take an active part in the discussion of these papers.

One of the papers of the Thursday morning session will deal with the physical properties of electrolytic iron—a product which is being turned out commercially, contrary to all predictions of ten years ago. There will also be papers on zinc, brass, and other electrodeposited metals.

On Thursday afternoon and Friday morning, a very interesting symposium on "Industrial Heating" will be in progress. The Electrothermic Division (Bradley Stoughton, Chairman; Colin G. Fink, Secretary) which held a most successful symposium on "Electric Cast Iron" at the Baltimore Meeting, in April last, will again be in charge. Twelve papers especially prepared for this session and dwelling on industrial heating in electric furnaces, other than fusion and melting furnaces, will be placed open to discussion.

There will be papers on

a. History of Industrial Heating.
b. Principles of Design of Furnaces.
c. Comparison of Fuel Costs in Different Types of Electric Furnaces, and with Combustion Furnaces. (In this connection, Electric Energy would be estimated as a "fuel cost.")
d. Resistor Materials.
e. Specific Heats.
f. Electric Conductivity of Insulating Materials at Industrial Furnace Temperatures.
g. Heat Emissivity.
h. Heat Transfer.

There will be an excursion to Shawinigan Falls, affording members a rare opportunity to inspect the various industrial plants of one of the most progressive centres on the continent. It is planned to have a special train for this all day trip from Montreal.

A popular lecture on the Progress in Physical Science is scheduled for Thursday evening. Section Q will be in charge of old fashioned Smoker on Friday evening.

The headquarters for this Meeting will be the Hotel Windsor. Members and guests are urged to make their hotel reservation immediately.

MAP OF MACKENZIE RIVER BASIN

The Geological Survey, Ottawa, has issued a new edition with revisions and corrections up to 1922, of Map No. 1580, *Mackenzie River Basin*, scale 50 miles to the inch. It shows the geology along the main water route from Edmonton to the Arctic. It can be obtained by those interested from the Director, Geological Survey, Ottawa.

The Glacier as an Aid to the Prospector

By MILNOR ROBERTS *

When a man is travelling over the range and finds a glacier blocking his route, he discusses the situation with his packhorse and wonders what useful purpose a glacier serves in the scheme of natural affairs. As a highway it is a failure; usually the edges are steep walls of glare ice, difficult to climb or descend, and separated from the adjacent mountainside by a deep chasm. Its surface is hummocky and pitted, or else littered with broken rock of all sizes lying so loosely as to slide or roll at the lightest touch. Here and there are crevices just too wide to jump and long enough to cause much delay if repeated detours are necessary. Only in winter does a glacier offer an easy route; at that season the snow has filled in the gulch along the side and built up an approach, and the drifts have arched over the fissures, leaving a glossy surface that makes fine going for the skiis and web-shoes. But in winter the prospector usually is holed up as snug as a coney.

Mark Twain's Journey

Mark Twain, in "A Tramp Abroad," narrates how he proved the worthlessness of a glacier as a means of rapid transport. Being aware that glaciers actually do move, he "resolved to take passage for Zermatt on the great Gorner glacier." Thereupon, he says, "I took up as good a position as I could upon the middle of the glacier — because Baedeker said the middle part travels the fastest. As a measure of economy, however, I put some of the heavier baggage on the shoreward parts, to go as slow freight." After watching to see the scenery go by and camping with his expedition for a night on the ice, he learned that the Gorner moves a little less than an inch a day, or say, 30 feet a year. The distance to Zermatt being three miles, a little over 500 years would have been required for the journey. Mark Twain concludes that "the passenger-part of this glacier — the central part — the lightning express part, so to speak — was not due in Zermatt till the summer of 2387, and that the baggage, coming along the slow edge, would not arrive until some generations later."

From a mining viewpoint, the most useful labor that the glaciers have accomplished has been the deep scoring of the earth's surface, with a resulting clean exposure of ore bodies. Illustrations of this operation are common in many places, especially in Alaska and at the higher altitudes in the western mountain ranges of Canada and the United States. To the eastward, where the topography and the glacial conditions are different, comparable if not quite similar action took place, but the illustrations are less numerous there because drift now covers a great proportion of the land area.

Canada's Iron Ore Removed

Regarding a part of the eastern territory, Capt. H. C. Dudley, a mining engineer, of Duluth, who for the past 20 years has been exploring and operating iron mines in the lake region, writes me informally on this subject as follows:

"As you probably know, the remnants of what must have been several good iron ranges are left in Canada, having been so deeply eroded by glacial action that only a few pockets remain, although the indications are quite remarkable, and the trail of ore leading up to the deposits sometimes covers several miles, strewn thickly with boulders of iron ore. The iron ranges of Minnesota and Michigan have also been greatly eroded, but in less degree. The pyrrhotite deposits, carrying copper and nickel, in Sudbury, have been exposed by glaciation, and probably ore bodies quite as large as those of the Creighton mine have been entirely swept away in the process which exposed the present hills of sulphide in the norite."

Here in the western mountains are numerous examples of ore deposits that were formed at moderate or great depths, and that have since been laid bare through the agencies of erosion, the latest of which was glaciation. Perhaps erosion had been going on for a very long time, even through several of the great geologic periods, and thousands of feet of rock had thus been removed before the ice began its shift with pick and scraper. Without comparing the relative degrees of strength of the several agencies that cause the breaking down of rocks, such as frost, meteoric waters, and stream erosion, it was the glacier that performed the last great stage and put on the final polish in the region described.

Veins Exposed by Glacial Erosion

Striking features of ice carving are its smoothness, sharpness and speed. So swiftly did the cutting proceed that it kept ahead of weathering processes, and performed its work in ore and country rock little changed by superficial agencies. Since the retreat of the ice so little time has elapsed that no great amount of alteration has taken place, and in consequence we find sulphides and other ore minerals that originated at depths of hundreds or even thousands of feet, appearing today at the immediate surface, and yet not showing the effects that usually accompany such a position in many other regions. For example, the ore bodies of the Kennecott mine in the Copper River region of Alaska occur in a ridge carved by glaciers which still exist, although shrunken in size; in fact, the mine buildings at the Jumbo stand on dead glacial ice. Solid masses of chalcocite, forming the highest grade copper ore bodies of large size that have ever been known, outcrop at the actual surface. Oxidation has attacked only the loosened material of the lode. The mines of British Columbia offer many instances of ores formed at depth, but now appearing unweathered at the surface, their relative change of position having been brought about through the agencies of erosion, including a final sweep by the ice.

The Glacier as Steam-Shovel

It is hardly necessary to point out to members of this convention the numerous cases of prominent ore bodies exposed in places where the results of ice action are evident. One has only to glance at the symmetrical, U-shaped valleys of this region to recognize the trail of the ice, and the local members may be depended upon to describe or show us their famous mines.

The characteristic of ice carving that is of greatest value to the miner is the cleanness with which the cuttings have been removed. Except for debris caught in pockets in the rock and in hollows protected by projecting ribs and bosses, the bedrock has been swept clean. The cuttings have been carried either to the nearby valleys, or

* (Written by Milnor Roberts, dean of the Washington School of Mines, Seattle, for the fourth International Mining Convention, at Nelson.)

through them and on to the distant lowlands, where they have accumulated as glacial drift or perhaps in mixed form as alluvium. Since the drift masks the rocks beneath it, what has been the mountain's gain in the way of exposing its mineral wealth has been the valley's loss through a corresponding concealment of its veins.

Last week, while standing on a rock-rib jutting up through the snow that still covers the ridges north of Mount Baker, I was gazing across a valley head to the glaciers two miles distant, perched on the shoulders and crown of the great cone. The ice, massive as it is, and showing a tremendous depth where even a part of it appears on the cliffs, is but a small remnant of the steely river that some thousands of years ago trailed down the valley. To go back a little farther in time, when a great sheet of ice covered nearly all parts of the range (excepting a few high peaks), makes the comparison of today still sharper, for then the valleys were filled from wall to wall and throughout their length from the summit of the range to the lowlands. As the area of the ice has diminished and its depth has shrunk, so has its power decreased. When it stood thousands of feet deep in the valleys, its movement must have exerted tremendous force. The harder blocks of stone imbedded in the bottom of the ice, backed by the great weight above them, must have gouged into the bedrock as sharply as the steel tool in a lathe chisels a casting.

Fresh Ore at Surface

A prospector who has known these mountains well for many years stood beside me, and pointed to a lead outcropping on the far wall of the valley 1,000 feet or more lower than our position, and again at points farther up the slope and just below the melting ends of the glaciers. On the near wall below us he has found a similar showing. On the other side of the ridge on which we stand are other showings of like nature. The ore is zinc blende, of a reddish brown hue; it occurs directly at the surface, and when touched with a pick, or even scratched by the nail in a boot, it shows the usual luster of the fresh mineral. On the steep slopes mosses and lichens alone have covered the lead, while in the hanging meadows a few feet of detritus and peaty muck conceal it; but in all cases where solid rock is exposed some sulphide particles glint brightly, although others in patches are oxidized.

Numerous other deposits in the same region present similar conditions. Leads extending through vertical ranges of many hundreds of feet show little variation in the general mode of their ore occurrence. The ore shoots may be widely scattered through the leads, but their general appearance is the same, although detailed study brings out differences. Again, separate leads found at elevations varying widely but all lying within a glacial valley, show uniform characteristics.

"Only the Surface"

The facts in these situations seem to be clear and to fit together logically. The earth has been dissected and an ore shoot laid bare, just as one might cut away half of an apple and expose its seeds to view. Whether the cutting left the greater part of a particular seed in the apple or removed most of it would be purely a matter of accident. The proportion of an ore shoot that may yet be remaining when found in the wall of a deeply cut glacial valley is equally a matter of chance; yet the prevalent idea is that at each outcrop it will be necessary to obtain 'depth' before the true character of the body can be determined. My prospector friend explains to his backer, a prospering physician, that these showings are merely the surface, leaving much to the imagination. It is a pity not to recognize the true situation and be thankful that the glaciers have carved the cirque so deeply and left the ore so clearly exposed. May it prove that the ice used that rare judgment so essential to a prospector and quit work when the ore shoot was widening!

It will be noticed that the useful work ascribed to glaciers is that which was done some time ago rather than quite recently. Glaciers in the north today are probably as vast and as active as they were here in glacial time, but in any case unless the ice has shrunk back and exposed the carved areas the results of its work remain unknown to man.

Glaciers Today

If any case has been made out as tending to show that the glacier by its past operations has been the prospector's friend, it must at the same time be admitted that the surviving members of the order if such cold blooded, sluggish monsters have enough fraternal ties to form an order have numerous acts to their discredit as well. Some years ago the western edge of the Russell glacier on the northerly shoulder of Mount Rainier rode up over a granite knob where a windlass stood over a shaft sunk on a copper molybdenite lead, and moved the sills, posts and all to one side in a gentle way that no snowslide could have accomplished. If the ice has to support an aerial tramway, its restless habit is a source of trouble to the operators, who frequently have to straighten up loose-legged towers and adjust the tension on the ropes. Railway tracks that have been laid on ice assumed to be dead have frequently rearranged their sleepers without orders. As tailings dams, glaciers are not trustworthy. They are liable at any time to swallow the whole heap, cyanide included.

A miner on the Snattle river complains that the high grade ore he piles each summer at the mouth of his drift has been badly scattered in the course of its transport down the valley by the ice route. A prospector near Doubtful lake used to drive through glacial ice for some distance before reaching his vein in the solid rock. By the next season his adit through the ice would have moved down the valley a little distance and he would be obliged to drive another one. Being attentive to his assessment work he soon had several of these cool tunnels lined up in a row, and would doubtless have been glad to dispose of them even at a loss. He might even have promised shipment in the bargain, to lower valley points, with date of delivery not specified.

A ROPE SEVEN MILES LONG

There was recently made by Wrights of Birmingham, England, a flattened strand wire seven miles long without splice in either strand or rope. It is 1¾ inches in diameter and weighs 60 long tons. As it was impossible to roll this rope on drums in the usual way it was shipped in coils on specially prepared railway trucks. Flattened strand ropes are increasing rapidly in popularity among users. An objection formerly made to them was their lack of flexibility. The modern design as adopted by Wrights provides a greatly increased degree of flexibility combined with the compactness that makes the use of the flattened strand so desirable.

The Dominion coal output for July, 1922, amounted to 2,284,676 tons, as compared with 1,911,[illegible] tons for June, 1922, and 1,850,555 tons for July, 1921.

Pure and Applied Science

(Abstract of address delivered by Dr. E. H. Griffiths I. I. D., F. R. S., at a Special General Meeting of the South Wales Institute of Engineers, held at Cardiff, Wales, on March 23, 1922.)

Editor's note—Dr. Griffiths' address, the full text of which appears in the Proceedings of the South Wales Institute of Engineers, is a strikingly lucid statement of the relationship subsisting between pure and applied science. The whole address, as will be gathered from the extracts and digest presented below, is what our neighbours of the south would call "inspirational." It typifies the mode of thought, the high mental plane of the best British men of science. Scores of men like Dr. Griffiths are doing their utmost to spur the youth of Great Britain on to equip themselves for scientific research. In Canada the awakening is yet to come.

I CLOSER UNION BETWEEN PURE AND APPLIED SCIENCE

Let me call your attention to the conditions prevalent some hundred years ago, after the close of the Napoleonic wars, those conditions in certain respects largely resembled those now existing. The same want of employment prevailed, discontent evidenced by riots was prevalent throughout the country. There was, however, an essential difference. The comparative smallness of our population might have made it possible for us to have become an agricultural community and self-supporting, but no such possibility is open to us to-day. That period, however, was followed by one of unexampled prosperity, and the basis of that advance was found in the application of science to the affairs of mankind...

About 1830 we entered on a period in which the discoveries of science were utilized for the purpose of industry a period of the replacement of manual by steam power. The discovery that one engine could do the work of a hundred men, and that so far from diminishing it increased employment, altered the whole face of our civilization. If, for example, a few thousand puddlers were thrown out by our employment of the Bessemer and Thomas processes, the increase in the output of steel gave employment to twenty times that number in the engineering trade...Workingmen never make a greater mistake than when they resent the introduction of machinery...

It is but slight exaggeration to say that this country had in the middle of the last century command of the industrial markets of the world. This supremacy, however, steadily diminished during the remaining years of that century, and this was due mainly to two causes:—

(1) Our great industries were controlled by able business men, but men with no scientific knowledge and with but little respect for it, and "rule of thumb" methods were prevalent; research was ignored.

(2) Other nations felt that their existence as industrial communities was threatened, and Germany, more especially, entered into the lists and profited by our mistakes...Her industries were guided by men with both business instincts and real scientific knowledge, a combination rarely found in this country.

It was in the laboratory of an English chemist, Sir William Perkin, that the discovery of aniline dyes was made nearly seventy years ago, yet the manufacture passed into the hands of Germany, which resulted in that multiplication of her chemical resources the effect of which we discovered during the war.....Why was this all-important industry taken from us? I believe the bed-rock causes were the indifference of our business-men to the discoveries of science and the want of co-ordination between the men who apply, that is, the engineers and manufacturing chemists, and the men who work at research in the laboratory, and we have paid dearly for our indifference.

It has been well said that this country has lost its preeminence in the dyeing and coal-tar industries because "the English manufacturer considered that a knowledge of the benzol market was of greater importance than a knowledge of the benzol theory."

It would be easy to multiply examples of industries founded on discoveries made by Englishmen and applied by the Germans. Hence to-day our position is, in many respects, more difficult than that of a hundred years ago. For our competitors are beating us at our own game. Is this due to lack of brain power or intelligence on our part? I do not for a moment believe it. The names of men who have made, and are making, the basic discoveries on which industries are or can be founded are in English and French rather than in German lists. Is it that our engineers are incapable of applying the knowledge thus placed at their disposal? Again, I do not believe it. In the list of the great engineering achievements of the last century with perhaps the exception of the Suez and Panama Canals, the names of English engineers are preeminent. In a popular vote taken by an American publication named *Popular Mechanics* as to the seven most wonderful applications of science for the purpose of mankind, the achievements which obtained the highest number were wireless telegraph, the telephone, the aeroplane, radium, antiseptics, spectro-analysis and X-rays. *Each one of these had its foundation in purely scientific work, and was not the result of deliberate intention to make something of service to humanity...*

During the past hundred years all the conditions of civilization have been transformed, not by legislators, not by soldiers or sailors, but through the agency of men seeking after knowledge for its own sake...

The conversion of a laboratory process into a commercial proposition requires both faith and capital. In the past the British business man has not been prepared to supply the capital until the commercial application has been proved successful. This, however, was impossible unless the necessary capital was provided; and thus we have travelled in a vicious circle... If our technical experts in engineering and chemistry devoted more of their energies to exploring and applying the stores of knowledge freely placed at their disposal by the pioneers of science rather than in the improvements of methods already established, then I believe we could face the future with greatly increased confidence. Unfortunately, as I have already indicated, there has existed in the past, and to some extent exists in the present, a wide gap between the laboratory and the market place... This is especially noticeable in the lapse of time which seems inevitable between the discovery and its application. Let me give you a few examples:—

In 1831 Faraday...established the fact that it was possible to generate electricity by the expenditure of mechanical work, but it was nearly fifty years before the discovery was used with commercial success in the construction of the dynamo.

Aluminium was discovered by Wohler in 1827. This was simply regarded as a scientific curiosity till about 1860. The manufacture of aluminium is now an industry employing millions of capital and thousands of labourers.

Phosphorus was discovered by Brandt in 1669, and exhibited to Charles II as "A wonder of Nature." It was not until 1834 that it was first used in the manufacture of matches . . .

About 1870 Maxwell established the theory that waves of light were due to an electro magnetic disturbance in the ether. It was not until 1896 that Marconi applied for a provisional specification of apparatus for signalling by electric waves . . .

During the past few years the works of Sir Joseph Thompson, Sir Ernest Rutherford, Dr. Ashton and many others have revealed to us the marvellous constitution of the atom, and are leading us to conceptions of the . . . nature of the chemical elements, and of the relation between what we have hitherto called matter and electricity, which are bound profoundly to influence the whole nature of future investigation . . . Our attitude of mind should be, not "Is there any possibility of utilizing a discovery?" but rather "In what way can this discovery be utilized?"...

As we look back on the last century we are driven to the conclusion that our prosperity has been chiefly due to our utilization of the energies supplied to us in centuries long past, and now available in the form of coal.

We are thus living on our capital; it is true that we are learning, but slowly, to utilize its latent energy in more economical methods than we have done in the past, but no thinking man can deny that not only is our capital diminishing, but that it is also becoming less available. The sources of energy in the densely populated regions of the globe are diminishing with increasing rapidity.

I believe the attention of our engineers must be directed to the possibility of actually transporting to our doors the energy daily showered in favoured regions of our earth rather than to the destruction of the sources supplied to us in the past.

I ask you to reflect for a moment "on our income of energy" . . . Observations by Buchanan taken in Egypt with an improved calorimeter led to the conclusion that each square metre of the earth's surface which is exposed perpendicularly to the sun's rays receives radiant energy equivalent to 1 h.p. Now the area of the great circle of the earth is roughly speaking 130 billion square metres, thus the working value of the sun's radiation to us is about 130 billion h.p.; if we deduce from this the h.p. radiation per 1 square foot of the sun's surface we obtain a value very decidedly less than that obtained by Lord Kelvin (7,000 h.p.) If the radiant solar energy falling on the earth were wholly converted into mechanical energy, each individual's share (including men, women, and children) would enable him to lift a weight of 3,300 pounds through a vertical distance of nearly 20 miles every minute of his life!

It is true that by application of water power the swing of the tides, the growth of plants, the combustion of wood, etc., we do, to some slight extent, utilize our income, but the fraction thus expended is negligible.

I venture to predict that our engineers and chemists will in the future have to rely on *direct* rather than on what I may term the indirect utilization of the energies supplied us by nature. I may doubtless seem guilty of presumption when I suggest to our rising generation of engineers and chemists the advisability of "going back to nature", that is, to a study of natural phenomena. By the combustion of coal at a temperature of thousands of degrees we evaporate water in a boiler, and by means of ponderous and ingenious machinery transfer energy by an electric current to our incandescent lamps. The actual light energy that we thus obtain is but a tiny fraction of the energy expended in the furnace. Consider by way of contrast the glowworm; it is estimated that it utilizes as light some 95 per cent. of the energy expended, and that without any appreciable rise in temperature.

Again, consider the astonishing prospects opened out to us by the discovery of the energy within the atom . . . If we could but learn the way to persuade the atom to commit suicide, and also discover how to utilize the resulting legacy of free electrons, then we should have no need to consider other sources of energy. The dissolution of radium (and also some other elements) indicates the possibility of such a process, and improbable as may be the realization of such a dream, it is not for this generation to assign limits to the march of discovery . . .

There is no branch of natural science which the engineer can afford to ignore. His dependence on the physicist, the chemist and the geologist is obvious, but I ask you to remember that the successful construction of the Panama Canal was due to the researches of zoologists, and even the designers of our aeroplanes had to call on the botanists for advice in the selection of their wing materials . . . We must remember that all branches of science are parts of one organic whole . . . It appears to me that one of our difficulties is the tendency to over specialization. The engineer should have easy access to all chambers in the temple of science . . . I want to induce our young engineers to be both optimistic and imaginative . . .

Determine that you will become liaison officers between the allied armies of pure and applied science. For the man of science, discoveries are an end in themselves, by the engineer they should be regarded as foundations on which he may surely build for the edification of mankind.

CORESPONDENCE

Editor, Canadian Mining Journal

Sir:—

I desire to correct a statement in your issue of July 28th in the article of "Canada's Iron Ore Problems" by G. C. MacKenzie, which reads as follows:

> "The nodulizing process has been very successfully applied both in Canada and the United States and has been proved less costly for an equal output than to have to install and to operate the briquetting process."

The statement as rendered is [illegible] briquetting processes. Since the adaptation of [illegible] roll press plants to the briquetting [illegible] contrary is true.

A plant using the Lanyon process [illegible] by the M. A. Hanna Fuel Co. at Buffalo, N. Y. [illegible] as a result it will be seen that the cost of [illegible] charge for tonnage is 40 per cent. less than [illegible] for sintering and nodulizing and 25 per cent. less [illegible] cost of operation. Further, the [illegible] shaped briquettes is excellent as a blast furnace [illegible]

Yours etc.,

V. D. Stillman,

General Briquetting Co.,

11 Broad St., New York.

Book Reviews

IRON ORE — Part 3 — British America. — Imperial Mineral Resources Bureau. 3s. 9½ d., post free, from H. M. Stationery Office, Imperial House, Kingsway, London, W. C. 2. — 115 pp.

As with all the outlying parts of the Empire, the mineral resources of Canada, including iron ore, are as yet only imperfectly known. Consequently the present volume must be considered suggestive rather than determinative. This is conceded in the statement in the summary that "with the data at present available, it is impossible to estimate even approximately the reserves of iron ore in Canada." The hope for the future is expressed in the closing sentence: "There are ample supplies of coal in the Dominion, and most of the other materials required by steel makers are to be found in abundance, a fact which affords a strong incentive to search for new and suitable deposits of iron ore."

The recent position is well indicated in the following sentences: "There are undoubtedly large resources of iron ore in Canada, but the majority of the deposits known at the present time consist of low-grade ores, which generally require treatment to raise them the standard of furnace requirements . . . . . By far the larger portion of the Dominion is practically unknown as regards its mineral resources, and only a very small portion in the more populated parts, along the coast and larger rivers, has been at all prospected. Sufficient evidence, however, has been obtained to indicate the great potentialities of the unprospected areas."

The reference above to coal supplies refers, of course, to the coal measures of Nova Scotia, Alberta and British Columbia. The description of individual districts and deposits, which comprises most of the volume, contains the conclusion that there still remains a good chance for locating in each of these provinces iron-ore deposits suitable for the basis of a great iron and steel industry.

One little error, either a misprint or a quotation from a report that has now been superseded, does injustice to one of our principal ore reserves. The Magpie and Helen Mines in Michipicoten District, Ontario, are credited with 2,000,000 tons of ore. Actually, the New Helen has proven ore to the extent of 100,000,000 tons at least, and probably much more.

For the rest of British America, British Guiana and Trinidad are almost completely unexplored, while nothing is known, officially, of iron ore in Jamaica or the Falkland Islands. Newfoundland, by virtue of its huge bedded deposits at Bell Island (Wabana) near St. Johns, has one of the largest known ore reserves in the world, estimated at about 3,500 million tons — sufficient to supply the demand of the whole world for a period of twenty years.

IRON ORE. — Part 4. — British Asia. Imperial Mineral Resources Bureau. 2s. 8½d. post free, from H. M. Stationery Office, Imperial House, Kingsway, London, W. C. 2. 65 pp.

British Asia is comprised mainly by British India, in which occurs one of the largest known reserves of high-grade iron ore in the world. Though a comparatively short distance to the west of Calcutta, these deposits remained unexplored until recent years. At present there is being built up, with remarkable rapidity, an iron and steel industry of world importance, firmly based upon this unsurpassed source of iron ore and a neighbouring supply of coal of good quality and of fair dimensions.

The principal ore deposits of India occur within an area of about 150 miles diameter, situated 300 miles west of Calcutta, and at an average distance of 120 miles from the coal field, which are to the north. They occur in rocks of pre Cambrian age, and are comparable with deposits of similar occurrence in the Lake Superior region, Brazil and elsewhere. Their total size is still undetermined, but one range 30 miles long in the Orissa region is estimated to contain 3,000 million tons, and the resources of the whole iron bearing area are estimated at 20,000 million tons of high grade ore, 60 per cent. or over in iron. The ore is hematite, locally altered to magnetite, and is characteristically of Bessemer grade, with only a few per cent of silica.

If only the visible supply of metallurgical coke were comparable to her known supplies of iron ore, India would be assured of an iron and steel industry of the first magnitude. But though the coal measures to the north and northwest of Calcutta are known to contain a very large supply of coal, only a small part of it is of metallurgical quality. The reserve of high-grade coking coal at present determined is 2,000 million tons, which will last only a comparatively few decades, if the present rate of increase in its use be maintained. It is suggested that the use of this high-grade coal be restricted to metallurgical purposes, and that the lower grade coal, of which there is an abundance, be used wherever possible.

Though its successful initiation is of only recent date, India's modern iron and steel industry is already of large dimensions. The principal producer at present is the Tata Iron and Steel Company, which now produces 900 tons of pig-iron a day and 17,500 tons of steel ingots a month, while additions at present nearing completion will raise these outputs an additional 1000 tons of pig-iron and 1000 tons of steel ingots a day. This company and its subsidiaries manufacture rails and miscellaneous rolled shapes, forgings, agricultural and industrial machinery, tin plate and enamelled utensils, wire products and pipe. In addition a plate mill has recently been completed. The Bengal Iron Company produces pig-iron and castings only, at the rate of 450 tons a day. The Indian Iron and Steel Company is erecting works to produce 600 tons of pig-iron a day. Two other companies, the Eastern Iron Company and the United Steel Corporation of Asia, are projected.

The rest of British Asia contains iron ore only in minor amount, and none of it is being used. Among Ceylon, the Malay States, Borneo, the mandatory states Mesopotamia and Palestine, and Hong Kong, only the last has an appreciable amount of ore. On the mainland portion of the Hong Kong colony a number of lenses of magnetite are known, containing several million tons of ore.

IRON ORE — Part 5. — Australia and New Zealand — Imperial Mineral Resources Bureau — 4s. 4d., post free, from H. M. Stationery Office, Imperial House, Kingsway, London, W. C. 2. 106 pp.

Prior to 1915, Australia possessed no iron smelting works of importance. The establishment in that year of the Broken Hill Proprietary Company's works at Newcastle, New South Wales, virtually initiated the iron and steel industry of the Commonwealth, which is now (barring incidental labour troubles) in a very sound position. The Newcastle works are capable of producing 1,500 tons of pig iron a day, and comprise as well basic open hearth steel furnaces, rolling mills, merchant mills, and foundry and forging plants. Another works at Lithgow has a capacity of 3,000 tons of pig-iron a week, and a steel works in addition. The Australian Electric Steel Company,

Limited, has been successful in producing steel in electric furnaces.

As the practical interest in Australia's iron ore deposits is of such recent date, not much is known of them, and that little mainly on the south coast, the interior and northern (tropical) parts being virtually unprospected so far as iron ore is concerned. At intervals along the coasts of each of the states (with the exception of Victoria) ore deposits of considerable magnitude and satisfactory grade have been found, the total known reserve being 345 million tons. The most important deposits up to the present are on the islands of Yampi Sound, in Western Australia, and at Iron Knob, in South Australia. The Yampi Sound deposits are huge beds of compact hematite, interbedded with highly metamorphosed sedimentary rocks. The Iron Knob deposits are large lenses averaging 68.5 per cent iron, which at present supply the iron works at Newcastle.

Coal of metallurgical grade is also readily obtainable on the south coast of Australia; so the conclusion that "the resources of Australia appear to be adequate for the establishment of an iron and steel industry capable of supplying the local demands and providing a surplus for export," would appear to be well justified.

New Zealand is not so well supplied with iron ore as is her larger neighbour. The principal deposit known is at Parapara near the northwest corner of the South Island. Here there has been determined 65 million tons of limonite of fair quality, locally called Onakaka ore. There are extensive deposits of titaniferous iron sand on the north Island, and an unsuccessful attempt has been made to smelt it by a new method. Lately the plant so used has been purchased for removal to the Onakaka ore beds where the limonite will be smelted. The lack of suitable coking coal has militated against the successful establishment of an iron smelting industry.

* * *

One small item is lacking in these reports—merely a convenience, but one that the reviewer has missed. The sketch maps accompanying all the volumes have no scale of miles. This might logically be included in future volumes.

PETROLEUM—WHERE AND HOW TO FIND IT

—By Anthony Blium—Published by the Modern Mining Books Publishing Company, 905-127 North Dearborn Street, Chicago, Illinois. Price $2.00.

Mr. Blium's name will recall many pleasant and picturesque memories to those who were in any way identified with gold mining in the Lake of the Woods region a quarter of a century ago. From the portrait that adorns the volume under review we should judge that the years have dealt not unkindly with the author and that his virility, vim and vigour are still unabated.

* * *

Books are inevitably the expression of authors' personalities. We conclude therefore that Mr. Blium does not place a very high estimate upon the acumen of the citizenry of the United States and Canada insofar as mining investment is concerned. Also we gather that he considers himself a competent guide, philosopher and friend to said citizenry. On one count Mr. Blium is perfectly right. Mining truths must, or should, be told to the populace in words of one syllable—here a little and there a little. As to Mr. Blium's fitness for the role of adviser, we think there is little room for doubt. Assuredly he knows the world and by this time he should be able to manhandle the "devil." The "flesh" has nothing to do with the matter in hand.

Some write because they wish to, some because they must. Mr. Blium is nothing if not fluent. His volume is comprehensive in title. He has tackled a large subject in a manner singularly confident, even we might venture to say *debonair*. Because of this confidence we doubt not that words of warning will do much good where and when they are read and heeded.

MINES AND QUARRIES OF CANADA

The Mines Branch, Ottawa, have just published their annual list of mines and quarries and allied industries throughout Canada. These lists are invaluable under certain circumstances, and the revised issue of this year will, no doubt, fulfil its useful purpose. The lists comprise the following:—

Metal Mines in Canada.
Coal Mines in Canada.
Non Metal Mines in Canada.
Stone Quarry Operators in Canada.
Manufacturers of Clay Products.
Operators of Sand and Gravel Pits.
Petroleum and Natural Gas Wells.
Cement Mills and Sand lime Brick Plants.
Lime Kilns in Canada.
Metallurgical Works in Canada.

Any or all these lists can be obtained by those interested from the Director, Mines Branch, Ottawa.

ENGINEERS WANTED

The Mines Branch, Department of Mines, Ottawa, have advertised positions vacant for two engineers "to make or assist in making, investigations and studies "in respect to the occurrence, recovery, marketing, and "utilization of Mineral Resources and Mining and Metallurgical products, to prepare reports on the results of the work and to perform other related work "as required." Technical graduates with a well rounded practical experience are required. The initial salary is $2,100 per annum, with an annual increase of $120 per annum until a maximum of $2,580 has been reached. Those interested should apply immediately for blank forms for application to the Civil Service Commission, Ottawa.

Soft coal production shot upward almost as suddenly as five months ago it had plunged downward when district after district accepted the Cleveland wage agreement and resumed work. Late returns for last week, August 21-26, indicate an output of 6,700,000 tons of bituminous coal and the present week, August 28-September 2, will show 9,200,000 or possibly 9,700,000 tons. The anthracite mines, however, are still idle. The increase has come almost exclusively from mines opening under the Cleveland agreement. The non-union districts of the Middle and Southern Appalachians are still limited by railroad disability and in spite of a slight increase in car supply are producing only 60 per cent of the rate at mid-July before the shopmen's strike.

In fact complaints of lack of cars have already again been received from the union districts of Eastern Ohio and Northern West Virginia. The limiting factor in production of bituminous coal has thus changed over night. A week ago it was the supply of mine labor; today it is transportation. The first response of the railroads to the demand for more cars has been favorable, partly because they had a surplus of 112,000 empties [illegible] when the union mines resumed work. Whether the roads can maintain the present rate of coal movement [illegible] the surplus of cars is exhausted remains to be seen.

A Budget From New York

By KIRBY THOMAS

Copper and Copper Stocks

A New York business man, whose activities for nearly a life time had necessitated the study of the markets for the basic natural resource commodities, and who had been concerned in the consideration of the securities based upon industries engaged in the production of such commodities, remarked recently at a down town luncheon club, that "copper and copper stocks seemed to be suffering from an acute case of 'statisticitis'". Pressed for an elaboration of his cryptic diagnosis of the "copper situation", he explained that for more than half a century the copper mining industry had grown, thrived and acquired a paramount position in the mining field, without the support and guidance of the tables of statistics, charts and graphs, which are now everywhere and always in evidence, whenever the subject of copper is discussed, especially by those who presume to speak as oracles. The mining companies multiplied and expanded to gigantic proportions, and many of them have prospered through many years. Fortunes have been made by mine owners and mine developers and profits and losses accrued to the participants in copper stock speculations much as they did to those who indulged in operations in other stock. All this went on without the inspired guidance of the "statistician". Since the collapse of the copper industry, following the hectic and stimulated markets of the War period, there has been an endless array and an everchanging succession of tables of statistics, all put forth in alleged answer to the question, "What is the matter with the copper industry?"

When trouble came into the copper camp, after the War, as it did into most other business, (due, as is now generally admitted, to the collapse of the business machinery of the civilized world, caused by the catastrophe of the World War), the statisticians came to the front. Their conclusions and deductions, it must now be admitted, confounded the directors of the copper companies and confused the public interested in the metal and in copper securities. The battle front swayed from "foreign markets" to "domestic consumption", and then advanced into the field of intricate details of "cost of production", based upon unilateral evidence from the companies' official statements. Recently, a new attack has been started all along the front, because of some new reported authentic data as to "secondary, or scrap copper".

Continuing, the business man said, "The trouble with the copper industry is the general problem of post-War adjustment, which has similarly affected most of the other basic industries. The industry will not be generally satisfactory until normalcy has returned throughout the world".

Whether these over-the-luncheon-table remarks may be seriously justified or not, the fact remains that the price of the metal copper has not increased as rapidly nor as much as was predicted by the market oracle, nor have the copper stocks advanced to the point promised in many of the official letters from brokers' offices. There has, however, been a substantial advance in the metal market. It is patent that the domestic demand for so essential a material as copper must be steadily increasing with the general resumption of industrial and building activities. The record of the exports furnish evidence of the increased use of the metal in Europe, and the financial authorities, in part at least, assert that the financial capacity of Europe to buy copper and other essential raw materials is slowly improving, except, of course, in Russia. The War reserve stocks in Europe and the vast amount of copper salvaged from the armament and munition depots, which, it is now belatedly discovered, were both very large, are now practically absorbed. These supplies constituted the "secondary copper" factor, now being discussed in copper circles. In addition to the gradual restoration of normal demand for copper, there has come about the new demand for radio apparatus and the prospective vastly enlarged demand which will result from the consummation of the large hydro-electric projects in every part of the world.

Most of the large producers of copper in this country are resuming production but upon a curtailed output basis. Hardy any new large copper mines in the United States or in Canada have been discovered or developed in recent years, and the prospective new productions in the next five years can hardly equal the certain exhaustion or depletion of the existing mines. The Mexican copper output is still small, due to political and economic troubles, and the South American copper companies will surely be slow in recovering from the adverse conditions, due to money exchange and high costs. It would seem, from these general factors, that for the immediate period of two or three years the demand for copper should increase faster than the supply, particularly if the few companies with large output continue the policy of curtailed operations until the surplus stocks are disposed of. Looking farther ahead, the demand for copper should increase at a greater rate than the supply if the business of the world maintains normal activity and increase. These general facts seem to point to a continued fair price for the metal and some increase on the average.

The price of copper, as with the other metals, is more directly dependent upon supply and demand than upon cost of production, for production costs vary with the different conditions of the deposit operated, and with the character of the ore, and the scale of operations.

As for the dictum of the statistician, it has just been announced that the stocks of refined copper were reduced during the first half of this year by 164,000,000 pounds. In June, the reduction in stock was 40,000,000 pounds, this being the excess of domestic consumption and export over refinery output. It is predicted that by the end of the year, the refined copper stocks will be reduced to about 365,000,000 pounds.

In connection with the general subject, it is interesting to note that the copper mines in this country are today producing 60 per cent. of the world's supply, and that 80 per cent. of the world's copper is refined in the American refineries.

Trade reports show an improvement in domestic demand and a continuation of exports, which is considered remarkable, in view of the still unsettled conditions in Europe.

As to the copper stocks, these are not directly dependent upon the price or statistical position of the metal, for each individual company has its own factor determining cost of production and product, and there

(Continued on next page)

News of Mining

United States

The quantity of gypsum produced in the United States during the year 1921 was 3,051,000 tons. Of this amount, 526,042 tons went to cement makers. The gross estimated value of crude and calcined gypsum was $23,700,290. More than 50 per cent. of all the gypsum was calcined before marketing. Imports amounted to 271,291 tons of which amount was responsible for the greater part, 267,045 tons. Canada's total production was 357,183 tons.

Production, imports, and consumption of bauxite in the United States were markedly less during 1921 than in the previous year. The total tonnage produced was 139,550 tons, almost all of which came from Arkansas. The gross value was $889,800. Imports were 27,587 tons, valued at $164,589.

Revision and passing of the McCumber Tariff Bill by the United States Senate was finished last month. The Bill now provides, amongst many other items, a tariff of 3 cents per lb. on nickel; 2½ cents on copper; 1½ cent on lead-bearing ore; 35 cents per pound on the metallic contents of molybdenum ore; 1 cent per pound on the metallic contents of manganese ore; 10 per cent. on amorphous graphite; crude gypsum, free; talc, if ground, 1 cent per pound, up to 25 per cent. ad valorem; and five sixteenth of one cent per pound on crude magnesite.

Current coal mining wage rats in northern West Virginia include the following:— Pick mining, seams five feet or over, open lights, $0.876 for room and pillar, $0.936 for entries; closed lights, room and pillar, $0.890, entries, 0.950. For seams under five feet the corresponding rates are, open lights, $0.95 and $1.065; closed lights, $0.964 and $1.079.

Great Britain

A comparison of returns in the coal mining industry for the three quarters ending, respectively, September 1921, December 1921, and March 1922, shows that, with successive lessenings of average earnings, the output of coal per miner display corresponding increases.

In a recently published article, Sir John Cadman, K. C. M. G., new chief technical adviser to the Anglo Persian Oil Company, expressed his belief that the chemist would in the near future find some method of liquifying coal and thus rendering it as mobile and economical in use as is petroleum.

Europe

The English firm of Stanley Sugden and Fisher controls the Roudny gold mine in Bohemia. For the first five months of 1922 the yield of gold from 14,000 tons of ore milled was 111.5 kilos. Great increases in wage rates and in the price of timber have now compelled the operators to seek government subvention.

The growth of lignite mining in Germany is indicated by the fact that, whereas the output in 1913 was about 87,000,000 tons, it now approximates an annual total of 130,000,000 tons. In the Cologne and Halle districts there are six large distillation and chemical plants. One company now produces 10,000,000 tons annually and generates 150,000 h. p. at a central power station.

Payments for Wabana iron ore, now being shipped to Rotterdam, are being made in British currency. It is thought that, with twelve steamers commissioned for this trade, the total shipments will amount to about 750,000 tons before the beginning of 1923.

The production of crude petroleum in Roumania during the first six months of the current year was 662,000 tons. Three leading companies, the Astra Romana, Romana America and Steaa Romana, produced about two thirds of the total.

Africa

Egypt does not yet produce sufficient petroleum to meet her own needs. Other Egyptian mineral production is relatively unimportant. The Sinai Mining Company produced 55,000 tons of manganese ore during 1921 and phosphate rock to the amount of 122,000 metric tons was mined.

The greatest tonnage of ore milled during the month of July on the Witwatersrand was that of the Crown Mines, 201,000 tons, on which the profit was £80,933. Government Areas, with a smaller tonnage, 140,000 tons, showed a profit of £149,156. The costs per ton at the Crown Mines was 24.s. 2d. per ton at the Government Areas 21.s 2d. per ton.

Mr. Malan, Minister of mines, South Africa, recently predicted a revival in the diamond market. A statement made in Parliament by Mr. Henderson, member for Bakesburg, to the effect that depressions in the diamond trade are brought about by inside influences every seven years, was deeply resented by other members.

The ore reserves of 39 Rand mining companies aggregate 80,000,000 tons. The highest average gold content is reported for the Meyer and Charlton. On this property the reserves are estimated at 396,000 tons, averaging 1.78 dwt per ton.

The coal output of the Transvaal during May was 490,740 tons. The output for the whole Union was 911,262 tons.

Among the most successful of the Rand mines so far as cost reduction goes is the Robinson Deep. Costs there were 5.s less in June than in November, 1921. The Modder B shows a reduction of 3.s. 9d. for the same period, and the Wolhuter, 4.s. 9d.

For the year ending 31st March, 1922, the Rhodesia Copper and General Exploration and Finance Company reports a balance of £22,259. A dividend of 10 per cent. was announced.

Shipments of low grade asbestos fibre have been [illegible] by Rhodesian producers.

The Belgian Congo produced more than 30,000 metric tons of copper during 1921. The output for 1920 was 15,500 metric tons. It is stated that Swedish capitalists are investigating the feasibility of hydro-electric plants for the further development of the Congo deposits. The [illegible] are to be situated near the falls at Pondi.

Australasia

Boring for oil on Kangaroo Island, South Australia, has brought in a considerable flow of gas.

1073 men were employed in alluvial gold mining in the State of Victoria during 1921, and 1977 men in [illegible] mining. The total yield for the year was [illegible] Gold mining companies paid dividends [illegible] £80 during the year.

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is to be considered always the question of the depletion and exhaustion of the reserve. However there are several large companies, whose stocks are on the market, which have such large reserves, and whose operations are so organized and on such a scale that they may be considered as manufacturing undertakings. These stocks, of course, should directly respond to the improvement in demand and to any regular increase in price for copper.

News and Comments

By ALEXANDER GRAY

"Read the Answer in the Stars"

A humorous light opera artist used to strike the risibilities of his audiences by singing this laughable thing. As a piece of prose the following may not be quite so ludicrous in one sense, but it will serve to remind President MacKay of the Associated Goldfields of Larder Lake that his shareholders have not as yet received any authentic report in detail as to what happened to the prodigious ore bodies, and on what basis the "assets" were valued:

Dr. MacKay's Statement

"The directors have pleasure in submitting the balance sheet of your company as at October 31st, 1921, showing cash and Victory bonds on hand, $614,630, development and office expenses $140,177.

"Mr. George Gray, our engineer on the property, who has been in charge since January last, will not have his report on the properties ready for about three months, after which time a meeting of the shareholders will be called and a full report presented.

"A financial statement will be presented today which will show assets of $21,953,603, the outstanding item of which is $20,985,398, which appears under the heading of Mining Properties, including development, timber limits and power rights at Raven Falls and Windego, at value at which acquired from vendors (satisfied in part by the issue of capital stock.)

"The other big item is cash and bonds as referred to by the president.

"The company is capitalized at $30,000,000 made up of 30,000,000 shares of the par value of $1 each, and the liability column shows issued trust receipts for 21,934,096 shares of $1 each, fully paid, $21,934,096."

Seven months have elapsed since that was administered to Associated shareholders. Mr. Gray, months before, had summarized the results of the work. Is Silence more golden than the ore bodies?

Aluminum Products Boosted

When the Senators at Washington were about it, they might as well have made it a penal office, punishable without regard to international rights, as to impose an impost of 60 per cent. ad valorem upon aluminum kitchen and household utensils. The intention was to make the duty 28 per cent. As an afterthought, 60 per cent. was inserted. It remains to be seen how this is going to popularize aluminum ware. Messina Springs aluminum works find Canadian hydro electric power acceptable; but Canada no doubt will be obliged to pay the extra charge on aluminum products—unless we compromise by making our own kitchenware. Washington is banning so much that the international jury may render an adverse verdict when it comes to the point of "take it or leave it."

Canada's Climatic and Mineralogical Elysium

Never—well hardly ever—was there a Mining Engineer who would allow his imagination free rein to the point of being riotous. Promoters and speculators make up for his deficiencies in this respect. That is why we have implicit confidence in the picturesque experiences graphically related by Frank Perry. Ordinarily the lay press might lapse from the veracious and leave a lingering doubt in the minds of the reader. But Mr. Perry being a Mining Engineer, formerly of Idaho and Montana, is to be accepted as the embodiment of truth when he describes the wonders and wealth of a British Columbia Valley—a Paradise so Arcadian and yet so materially transcendant that the Yellowstone and Yosemite fade into the commonplace by comparison. It is a coincidenced that when the splendors of the Yellowstone country were revealed by the adventurous, incredulity was displayed. Arboreal beauties, glories of geysers, the pellucid lakes set amid incomparable stage effects, were greeted by the skeptical as the conjurings of a lineal descendant of Munchausen.

Mining Engineer Perry, being a Mining Engineer and constitutionally conservative, will entrust no one with more than his glowing generalization. It is his own secret. For fourteen years he roamed over British Columbia. Presumably they were unprofitable years, since he admits his belongings consisted of four pack dogs, the usual prospector's outfit, the help of Providence and a toothbrush. Of course he had a rifle and, perhaps, a shot gun, otherwise he could not have varied his regimen with the essence of moose meat—the "concentrated extracts" of moose meat,—to be strictly correct. Seemingly he would have had less of that nutritive emergency ration were it not that fortune favoured him during a sub-Arctic blizzard. He was footsore and heart-weary as he stumbled up a hill along with two dogs—somewhere in latitude 57-63, longitude 122-131—deliberately vague, and advisedly so, because Perry on reaching the summit was regaled by a panorama of surpassing grandeur. Below him was a valley, enchanted, haloed in vapors, tropical, populated with game. Descending and in due course extending his explorations, there were rose bushes luxuriant beyond previous human ken, as large as trees. Apart from trappers, no human foot had tainted this Arcadia. Vapors emanating from hot springs and "almost boiling lakes" shielded from frost the foliage of the valley. Even Indians would not go there believing the enchanted valley was haunted or an inferno, canopied with smoke. Perry had the Eden all to himself.

The soil is estimated at 100 feet deep. Perry, by education and engineering instinct was unconcerned about soil. He observed the volcanic action, took note of the igneous rocks, and he brought out samples containing a "high percentage of gold, silver and copper", as well as coal and iron ore. One iron ore body is 800 feet wide and 200 feet thick.

The cap sheaf of the whole natural situation is the fertilization of the soil by the springs. A valley such as this, twenty miles long and between 25 and 40 miles wide, rich in all the attributes making for human content and wealth awaiting the taking of it, entitles Perry to a pedestal and appropriate decorations. British Columbia, predestined to become a world mining center, now should appreciate this Perryhelion (if a pun be permissible) upon its Ossa of multiform native wealth. The essence of moose meat hereafter will be regarded as an exhilirant as well as invigorant. Perry no doubt will become an F. G. S., F. R. G. S., Speaker of the Veritas Society, etc. May be he is not too preoccupied to associate himself with a few mining enterprises nearer to our own Home and Fireside.

The Mining Districts

FROM THE JOURNAL'S CORRESPONDENTS

BRITISH COLUMBIA

Esperanzo Now a Shipper

The Esperanzo Mine, Alice Arm, has commenced shipping ore. Approximately 750 sacks of high grade has been sent to the smelter for treatment and about 40 tons of lower grade ore is ready for shipment.

Promising showings are reported to have been found on the Alice and Lone Maid properties to the Esperanzo Alice Arm.

Record Output at Anyox

Announcement is made that all records for production were broken in July by the Granby Consolidated Mining & Smelting Co's Anyox plant. Over 3,000,000 lbs. of copper matte were turned out. The smelter has frequently reached an output of 2,700,000 to 2,800,000 lbs in a month, but never before exceeded 3,000,000 lbs. The local press carry photographs showing 7,800 bars of matte lying on the C. P. R. docks at Vancouver pending shipment to the New Jersey refinery. These bars contain values in copper, gold and silver, and are estimated to have a total value of $568,282.97.

It is reported that this Company now is making its copper for around 9½c a lb. This is cheaper than at any time of the Company's history comparing with 11.63c last year, and 15.95c in 1920. Production in the first half of 1922 was at the annual rate of 25,000,000 lbs. Production during the latter half of this year is expected to total 15,000,000 lbs. as the Company, it is said, does not intend to increase its output before the new rise in the price of copper. It is figured that the Granby Company is equipped to produce about 50,000,000 lbs of copper annually.

Lode Gold Reported on Caribou

A discovery has been made on Lowhee Mountain in the Barkerville section of Cariboo District which seems to be important. A vein approximately 11 ft. wide of gold-bearing quartz has been opened up and A. Sanders, a prospector and the holder of the property, claims to be getting large returns from it. Only little development already done.

News of another find has reached Barkerville. The record was made by a prospector named E. Moore, and is situated in the watershed between Upper Cunningham and Harvey Creeks. It is an immense lode of quartz, apparently about 60 ft. wide, and highly mineralized.

The Britannia Mining Company has been released of all further obligations in respect of the ammonia gas explosion which occurred at the bottom of the downcast shaft of the mill at Britannia Beach. The Company has paid claims amounting to approximately $36,000.

There was only one strike during the year in the Consolidated Mining & Smelting Co. during the month August 14th to 21st. This was in the Coldstream Valley. Considerable shipments were made by the Emerald at Salmo, and the Silversmith, Sandon. The Company mines shipped 5,950 tons.

Ralph W. Smailes of Seattle Wash. has been inspecting a number of mining properties in the Greenwood District, B. C.

The Revenge mine, adjoining the Bell at Beaverdell, and owned by George Barrett, has been leased and bonded by Louis Chery, John Bergman and Ernest Granberg. The consideration was $35,000, a small part being in cash and 50 per cent. net of the smelter returns to be applied to the principal until the whole is paid.

Clarence Cunningham is running one shift at the Mamie mill, and treating ore from the Wonderful mine.

Kaslo Creek Property to be Re-equipped

Joseph C. Roberts, one of the purchasers of the Gibson group of mines on the south fork of Kaslo Creek, recently made a thorough examination of the property in company with W. T. Dumbleton, a consulting engineer of Tacoma, Washington. They made a special examination of the fires of forest fires which have almost entirely wiped out the surface equipment. This is to be replaced without loss of time in order to permit an early start on development work.

Zeal Iron & Water Property

Recent work on the May Blossom group, Quartz Creek, Wymer District, have shown up 30 inches of fine ore together with some galena and lead carbonates. A. F. Harbeth, of Wakefield, Washington, the owner, has driven along this ore body for 1500 feet. He is convinced that he has a large body of first class ore and proposes to develop it on a considerable scale.

Developments at Sheep Creek

The Sheep Creek Mining syndicate of Vancouver has bonded the Kootenay Bell, Sheep Creek, and arrangements are being made for development work.

The McAllister mine, Sandon, should be a consistent shipper early next year. R. V. Gillies, the manager, says that a 1600 ft. tunnel will be run through, and a lead at a lower depth will be completed by next March.

The vertical shaft on the Queen Mine, Sandon, which is 600 feet or deeper, and connects with the 400 level, is being unwatered. William Deary is in charge of the work. As soon as the pumping has been completed further development will be undertaken.

Investigating Claim Claimed to Contain

Deposits of kaolin equal to the best grades of china clay for porcelain have been found on the Pacific Great Eastern Railway, according to information received by Premier Oliver of British Columbia. Investigations are being made as to the extent and commercial possibilities of the deposit.

Sale for Taxes and Sale Price Explained

J. D. Shields and A. W. Neil, of Victoria, have been appointed by the provincial government of British Columbia to sell the property of the Victoria Chemical Co., Ltd., which is situated at Saanich, and which plant is to be operated at Saanichton. The sale has been ordered by the Supreme Court in order to satisfy a claim of the Dominion Government for taxes.

Geologists Examine Kispiox Valley for Oil

A special investigation will be made this summer of the possibilities of the Kispiox Valley, Northern British Columbia from the standpoint of oil production. Reports have been received from time to time of the discovery of seepages and oil shale in this section. Competent geologist therefore, are being instructed to visit the field and submit reports.

No Shortage of Coal in B. C.

J. M. Savage, Manager of the Canadian Collieries (D) Ltd. is authority for the statement that there will be no shortage of coal in British Columbia this winter. He says that the only effect of the strikes that have depressed the industry in United States and other parts of Canada has been to promote activity in the coal-fields of Vancouver Island and other parts of the Province. He observes that difficulty in obtaining coal along the Coast of British Columbia is not caused by lack of the fuel, but by interference through severe weather with deliveries. The strike, however, has had one result in the northwest which is being felt by coal operators. Fuel oil is being used to a larger extent than in the past. This movement has been encouraged by the drop in the price of oil, which is being quoted in Seattle, Washington, at $1.10 a barrel, as compared with $2.50 a barrel a year or so ago. Oil now is being used extensively by industrial plants which had been converted into users of coal or coal dust.

Fewer Coal Mine Fatalities in United States

George S. Rice, of the United States Bureau of Mines, is visiting British Columbia and has been in conference with the Hon. Wm. Sloan, Minister of Mines, with reference to various matters effecting the operation of coal mines on Vancouver Island. He declares that accidents in the coal mines of America have decreased 25 per cent. in the last few years. This has been brought about by greater care in the inspection of coal mine workings. The value of the coal miner, he states, has been raised since the coming into effect of Workmen's Compensation Acts. Before a funeral perhaps $500 was all that a worker's family could expect from the average employer. Today a man's death means the paying out of several thousand dollars compensation. Mr. Rice asserts that largely through the technical services of the Bureau of Mines, explosions, once the most frequent cause of death and injury, have been almost entirely eliminated. Individual accidents from falling roofs and cave-ins are the most general cause of trouble today. He concluded: "The number of individual accidents is being lessened all the time. Up to date the American system of coal mine operation has been to wait until signs of trouble appear before taking steps to meet it. In Britain and the rest of Europe precautions to avoid accident are taken all the time, whether trouble appears imminent or not. We are gradually coming to that system in the United States."

Wider Use for Alberta Coal

Coal mine operators and business men generally in the Province of Alberta are looking forward to the time when the coal of Alberta will be exported to a much larger extent to the eastern Canadian market. With the settlement of the strike it is thought likely that a start in this direction will be possible. A material reduction in freight rate is being sought, and influential western men are agitating at Ottawa for the granting of a subsidy on Alberta coal bound to eastern markets. What is wanted now, they state, is not just something that will fill the gap in the East, caused by the American shortage, but action that will assure a permanent market for the product of the Province of Alberta.

Crow's Nest Coal Mines Now Producing

The miners are back at work in the Crow's Nest coal-field, Eastern British Columbia. Already the mines are on a production basis. Strikers who have found temporary employment in logging camps and elsewhere have dropped their stop-gap jobs and gone back to their working places underground. This will mean that the coking ovens at Michel soon will be in full blast, manufacturing for the Trail Smelter and other markets. It is possible that the ovens at Union Bay, Canadian Collieries (D) Ltd. deprived of this outlet will again be closed down. Certainly the pressure on the Vancouver Island Colleries, which has caused remarkable activity during the past few months and abnormal production, will be relieved.

NOVA SCOTIA

Struggle for Cheap Fuel is Ended

The whole American continent has been demanding cheap fuel for both business and domestic purposes since the cessation of war. It is commonly stated that the high cost of coal increases the railway rates and these two factors, including wages, are the chief cause of the present high cost of living.

To satisfy the demands of the public, efforts have been made by nearly all the coal mining concerns of North America to reduce the cost of mining coal that it might be sold at lower prices. To do this, miners' wages had to be reduced; but it now seems that the result of attempting to force a reduction of wages had the opposite effect and raised the selling price of coal through the scarcity caused by strikes of almost continental dimensions. While the short struggle between the miners and their employers in Nova Scotia was taking place, the public had an opportunity of learning some things about coal mining that are not generally known. There is a body of opinion which believes that every coal mine is a bonanza and the owners become wealthy in a very short time. Even the miners themselves, who know better, are in the habit of giving out statements which they know are most misleading; but because they want to throw dust in the eyes of the general public and in a small way help their own cause, they become the ready propagators of these dangerous half-truths. When contending in a wage dispute the price per ton paid to the miner is usually compared with the price paid by the consumer, and as this rate may run from 75c. to $1.00 per ton or perhaps more, the public get it into their minds that they are being fleeced by the Coal Companies. They forget, or rather they do not know, the great expense attached to coal mining. If what has lately occurred at Nova Scotian collieries has enabled us to understand more clearly how much we are controlled by outside influence, the short struggle has not been in vain. American competition fixes the coal and steel prices of Canada and controls the labor, and whether we like it or not, when the economic conditions of the United States improve and wages move up, wages in Canada must follow or our industries will be affected by the migration of workmen to more prosperous parts. This is going on in a marked degree at the present time and there is only one way to meet it.

Progress to Accompany Peace

The industrial life of Nova Scotia, especially the mining side of it, may now proceed along the way of progress without let or hindrance. The vote taken on the Agreement offered by the Dominion Coal Company was large and favored its acceptance. Springhill was the only mining town that went against it, but they must yield to the majority. For many years Springhill was an eyesore to the whole Province, and Springhill strikes became proverbial. It is to be hoped that this is but a lapse rather than a reversion to type on their part.

With the Steel workers satisfied by a wage increase and the big industries of the Province in tune, we may expect a revival of business along all lines. It is much needed and all are looking forward with expectant eyes to better days to come.

The Coal Company is now free to carry out the large programme of development which they intended to begin last spring. Work on the new collieries will be immediately begun; outputs will be increased; large numbers of men will be employed and business generally will be benefited. Let us hope that with a new beginning there will be an effort on the part of all toward effective co-operation. We hope we shall have no more of the abusive, insulting language of labor leaders, which is strongly resented by all sensible citizens of the Province, and leads nowhere.

Early Co-operation of Miners

The new agreement between the Dominion Coal Company and the United Mine Workers has been accepted and business can now settle down for the coming eighteen months. If it is found that the coal industry can do a profitable business at the present wage rates, then these may become the basis for all future negotiations on wage questions. No base wages rates were ever laid down in making agreements in Nova Scotia. The contract and datal rates were simply taken as they were and increased as trade permitted and as the cost of living demanded. Apart from minor adjustments, this is the first wage reduction by agreement in mining rates in our province. Wages during the last forty years have been advancing. The upward trend has been slow at times, but nevertheless sure. The early days of the coal industry were marked by fierce conflict and the trade advanced or receded just as the trade policy of the United States permitted. In years of internal warfare in that country, the coal trade prospered in Nova Scotia, only to become depressed after peace was proclaimed. It remained for the Dominion Coal Company to put the business on a stable basis and to give it an impetus that enabled it to surmount all obstacles and to finally attain its greatest success. The company was most fortunate at the beginning in its workmen. They had passed through times of deep depression in the coal trade and when they fully realized the import of the "Whitney Monopoly", as the politician styled it, they made up their minds to co-operate with it and they did so. This co-operation gave the Coal Company confidence and they reached out to new markets both in the United States and in Canada. The net result of this trade was to give steady employment at the collieries and to stimulate business all over the Province. It had been a common custom each fall when the contracts were filled to close down the collieries for five or six months, and if by chance some colliery did work, it was at what was known as the banking rates, usually eight cents per ton below the summer rate, and miners counted themselves lucky if they were permitted to fill their coal without having to riddle it. With the inception of the Dominion Coal Company, winter rates were abolished and away went the riddle forever from the coal mine, and for years the collieries worked just as steadily in winter as in summer.

Those were prosperous, happy days at the collieries, and but for them the coal trade could never have been sufficiently established to give industrial leaders confidence to go further and create allied industries, which would help to develop further the coal industry and give a market in the heart of the mining district. The Steel Workers at Sydney, when in full operation, use 4000 tons of coal per day — an amount greater than the output of the New Waterford collieries. What this means in the winter months when shipping has ceased is best understood by those dependent on the trade for their livelihood.

Miners Adopt Antagonistic Attitude

It appears, however, that we have passed away from the days when every workman felt it to be his duty to foster the coal trade. The Dominion Government was then helping the steel industry to its feet. The time came when it was believed that this industry could stand alone on its feet, and the bonus on steel was withdrawn. Whether with the withdrawal of Government aid went the desire of the miners to fully co-operate with the Coal Company, or wether they began to believe that working together was no longer necessary, it is very evident today that there is but one thought in their mind, and that is that the coal industry owes them a living wage. Steady employment must now take a secondary place and miners are ready to take their chances with the amount of employment they will have so long as the daily wage they receive is commensurate with their ideas of a living wage rather than what the industry can afford to pay, or even with high yearly earnings. It is quite possible to force wages to a high level, but to keep them there and do business is another thing. Of one thing we are certain, and that is that the growing time of Nova Scotia's coal industry was when all worked together with one aim, that aim being to make the industry a success. Wages were not high, but the concensus of opinion today is that men then had more money to lay by than they have now, and miners were more contented. They were relatively better off, because they labored to improve their own industry and to give the large buyers of coal the impression that a contract for coal once made was as good as filled. To get back to that position should now be the aim of every miner.

The Strike in Retrospect

Looking back to the beginning of the dispute, now settled, we see a very heavy reduction in wages imposed when work was broken. Weekly earnings were very much reduced. Coming so suddenly after a prolonged period of high wages, the workmen were not in a mood to accept it. Their leaders added to the fire by using insulting and abusive language towards the Company, and by leading the men to adopt tactics that recoiled on them. Although provoked by the offensive methods of the Mine Workers, at a time when business was bad, the Dominion Coal Company took every opportunity to show the public that they were ready to adopt any rational means to settle the dispute, hence they willingly agreed to the decisions of two Arbitration Boards, and met the Executive of the United Mine Workers whenever requested. This won public sympathy for the Company, and when the call to save the collieries came the whole country responded. The defiant attitude of the miners met with a definite opposition from public opinion, which has gone a long way to demonstrate that so far as Canada is concerned the Red revolution so much desired by some is not yet feasible. The most re-

result of the despair to propagate labor politics, and before it ended workmen began to see clearly that they were being used for other purposes than to settle a wage dispute. Once these points were seen, things began moving on the labor camp, and it is the fray the moderates fell in the U. M. W. contest, we are now confident that the moderates control the situation, in Glace Bay at least. Neither the men nor their leaders are seeing as red as they did, and when the reaction towards sanity is over, it may be possible to see both the miners and their leaders "sitting clothed and in their right minds."

Company Wishes to Co-operate With Union

There is one feature of the dispute that should appeal to all workmen at this time, and that is the patience the Dominion Coal Company showed with the Mine Workers' Organization during the last eight months, when unfair tactics were used and when the threat of bankruptcy was held, like the sword of Damocles, suspended over their heads, unlike the Coal Operators of the United States, they did not repudiate the check-off. They might have done so, for they had just cause. "Striking on the job" and pulling the pumpsmen and other maintenance men out were never tried in the United States, and yet the operators of that country are striking at the vital part of the trades union organization when they refuse the check-off. But the Dominion Coal Company does not wish to retaliate. They desire to have the goodwill of their workmen and prefer to do business with them in the organization they have adopted.

There is now a strong suspicion in the minds of many miners of Nova Scotia. They believe that if agreements making and keeping them poor, but that it cost them the wages that might have been granted under a retroactive agreement. They preached "no profits" and they practised it, and this blindness reacted against themselves, so that when the time to settle up came, they could not in all fairness ask for something they had destroyed.

Long-Term Agreement Satisfactory

Another phase of the agreement is pleasing, and that is the period of time over which it extends:—eighteen months. This gives stability to business and tends towards peace and progress. But the time of the expiry of an agreement has always been a sore spot with the miners of the Nova Scotia. They believe that if agreements were made in May or June they would fare better. There is little to this argument. The geographical position of Cape Breton in relation to the coal market is favorable in the summer season when shipping is unimpeded and unfavorable in winter when shipping has ceased. In order to know how much coal is to be placed on the coal heaps and what organization it is necessary to carry, the Company must make their large contracts before the end of February. They must therefore have their agreements made at the latest in January. If not, then the workmen stand to suffer by short work at a season of the year when it is hardest to live, and the Company has less coal to put on the market when seasonal conditions permit free transportation. A coal pile means wages paid out to workmen without return, and the company is going to pay out two million dollars in wages and take the risk of loss by fire if there is not some market for the coal when it can be moved. Neither the Coal Company nor the workmen of Cape Breton can alter these conditions, and there is nothing about them that is hidden. We have stated before the fact that Nova Scotian coal is competing against coal mined in the United States under entirely different conditions. Besides having many advantages such as thick seams lying level and under thin cover, they have no stocking of coal to do, for they are not ice-bound three months in the year, and can fill their orders as they come in. Cape Breton Collieries are mining coal at a tremendous natural disadvantage and to add others artificially—like making summer agreements—would lead to disaster.

Dr. McKinnon's Good Offices

The new agreement was reached by compromise. The miners insisted on the 1921 rates and the Company refused. The McKinnon Award of 1920 had always been popular with the workmen because the principle of the Award recognized the necessity of helping the lower paid workman. So when Dr. McKinnon, in whom the miners placed implicit confidence, was drawn into the dispute, it was felt that it was as good as settled. He insisted on the spirit of compromise, and with both sides yielding, a compromise was effected. Should this spirit continue to govern the miners of Nova Scotia, it will be most fortunate and the long drawn-out struggle will not have been in vain. Why such fierce hostility should be manifested towards the Dominion Coal Company, which on every occasion has been ready to meet the Mine Workers, is hard to understand. Both the workmen and the Company stand to lose heavily by a continuation of such tactics. Having met each other half way, why, should not this way of doing business continue?

A TALK ON THRIFT

By S. W. STRAUS
President American Society for Thrift

"The greatest of faults," says Carlyle, "is to be conscious of none." No man who has made progress in the world has done so without making mistakes. Errors of judgment and faulty decisions are bound to occur. But progress and success come through learning the lessons that our mistakes teach us. Failure, on the other hand, comes through the repetition of one's errors.

To eliminate mistakes, as the result of the close study of one's personal problems, is efficiency. It is this quality that distinguishes the thrifty man from the man who is thriftless. The latter continues the mistakes of wasting money, time, energies and opportunities. The thrifty man learns in the school of experience that these things mean retrogression. While he makes mistakes, he is personally organized along such lines of efficiency that he is not likely to repeat them. His practices of thrift and self-denial have developed will power and character. Therefore, his mistakes become sources of strength. Instead of millstones about his neck he makes them stepping stones to greater accomplishments.

Do not bemoan your mistakes. If you are a young man or young woman standing today on the threshold of life, do not imagine that you will go through the journey without making mistakes or displaying short-comings. The question of your success or failure in life will not depend on whether you make errors. For you are sure to do this. It will depend on your ability to take advantage of them, to avoid their repetition and utilize them as necessary lessons in the development of character and judgment.

EDITORIAL

The time has gone for running through the woods with a canoe and a pick. We have found our iron ranges, and in large numbers and great size. The question now is: What is in the bottom of them? —*A. B. Willmott*—1904.

THE LABOUR PROBLEM

The various strikes that have interrupted coal mining operations in Canada during recent months have all been settled. Each of the settlements is a compromise, to which numerous factors have contributed. The conflicting interests of miners who want more wages, investors who want higher dividends, and the public who want cheaper and better coal, have been brought into temporary adjustment. It would seem that, of the three parties interested, the public has had by far the worst of the bargain. The public has had no effective protagonist in the struggle, and no advocate in the settlement. Our government departments, who should represent the cause of the public in such a case, are mere administrative organizations, without a public mandate for a purpose such as this. Our political representatives, elected nominally to safe-guard the public interest, are in the main far too busily engaged in grinding axes or in balancing on a fence to serve the true interests of their constituents.

This being the imperfect state of our political and administrative departments, what can be done to effect a settlement of the various conflicting interests that will be a little better than the present temporary measure of compromise? To answer this question would be to solve one of the riddles of modern industrial life. Here we can merely refer to some of the means of alleviating the evil of continuous disagreement that will be applicable to the case in point.

The recent findings of the Scott Conciliation Board in Nova Scotia have brought to the fore once again the importance of proper housing and general living conditions in a mining community. If the miner's wife is comfortable and contented the miners is likely to follow suit. Our correspondent for Nova Scotia has described from time to time a number of movements that tend toward the contentment, as well as the efficiency and prosperity of the miner. The improvement and even beautifying of the appearance of buildings, equipment and grounds has a value as yet recognized only by a few discerning ones. Those twin accomplishments, order and thoroughness, can be applied to all work both above and underground with a vast resultant economy, in the long run, of both human labor and material. The miner can by various means be made virtually a partner in the company, sharing in the profits of his labour with the investor, as does the British coal miner today. A dozen other such expedients could be cited; but all lead to the one conclusion.

When all is said and done, so far as we erring mortals can glimpse and then achieve the ideal, *education* sums up the total of our effort. As our expedients conform to the ideal of a sound and lasting scheme of education, they are effective; if they are merely stop-gap compromises, confusion worse confounded is bound to follow. Our problem, then, is to obtain a clear vision of the ideal toward which we must aim, and to formulate a comprehensive and well-founded plan of action that will result in so educating our workers that they likewise will glimpse the ideal and work with us toward it. This may be considered rather a lofty view to direct the settlement of ever-recurrent labour disputes; but we are convinced that any practical ideal less lofty will lead to no good and permanent solution of our problem.

We are glad to hear that Mr. D. H. McDougall is to bend his energies to a study of the labour problem in Cape Breton. Mr. McDougall is a rational human being, as well as an accomplished executive and a gentleman. We are satisfied that if he applies his talents to this, the most serious problem that confronts his Company, as it does our whole Dominion, the result will show time and energy well invested.

THE USE OF ALBERTA'S COAL

It is estimated that one sixth of the world's available coal is to be found in the province of Alberta. How easily some, at least, of this is available, we illustrate today on another page. Just at present the chief trouble with Alberta's coal is that there is too much of it—it is so easily and cheaply developed that it is hardly worth the miner's trouble to put it on the cars. The population of Alberta is sparse and scattered, and the mountains, themselves well provided with coal beds, on one side, and the vast extent of plain on the other prevent the shipment of fuel to distant markets that would readily take it at anywhere near the pit mouth price.

These vast deposits of coal have for a generation past been the subject of vague speculation usually projected into the centuries to come. It has been predicted that in the years to come the prairie lands will become thickly populated, and will even grow to be the centre of popu-

lation for Canada. With this there will come naturally an industrial growth, based mainly upon the supply of coal.

These conjectures seem logical enough; but we should like to evolve some ideas of more immediate and more practical interest. How can the coal operators of the province of Alberta find a more extended market for their product? How can they change the present seasonal demand for coal as fuel into a demand that will keep their miners and plants busy all the year round? This problem has been faced at one time or another by almost every coal field, and in many instances the solution has been found in the establishment of a metallurgical industry, more particularly of an iron industry.

Of merchantable iron ore, Alberta has at present none discovered. This is not to say that none will be discovered as the search proceeds. But even if iron ore of the proper grade and in sufficient quantity were now available, it is a question whether an iron smelting and steel works could be worked profitably under the present conditions. This is a matter that must be left to the decision of those well versed in the commercial aspects of the case. Meantime we can look at some of the outstanding facts.

Alberta is far removed from any centre of production of iron and steel, and pays dearly for both semi-manufactured and manufactured iron products by reason of these great distances. Conversely, the expense of transporting her own products, almost exclusively agricultural, to these distant markets is so great that the profit is correspondingly small. It seems probable that, were commercial iron ore found in a suitable location in Alberta, this very fact of comparative isolation and the enhanced value of imported materials would provide a chance for successful operation. Even a small plant with a diversified production might succeed under these favourable circumstances. Once established, such a plant would create the conditions essential to its further progress, as has been demonstrated so clearly in the great and growing central industrial area of the United States. Even a small industrial population would provide a more lucrative market for agricultural products, which would induce more intensive cultivation and thicker settlement, which would again provide a better market for the smelter and mills; and so on for generations to come. The problem is how to initiate this cycle of progress.

The only iron-ore deposit of any dimensions known at present in Alberta is in the form of beds of titaniferous ore extending northward from the railway at Burmis, near Blairmore. These are, apparently, rather extensive, though their content of that bug-bear, titanium, has prevented their thorough exploration. It is possible that advances in ferrous metallurgy may bring such ore into the market, when the proximity of these deposits to first-class coal may make them of commercial significance.

Elsewhere in Alberta, the chief chances for finding iron ore would appear to be in the long strip of Palaeozoic and late pre-Cambrian rocks that compose and fringe the Rocky Mountains on their eastern side. All this area is within easy reach of good coal, though all of it is not yet within reach of a railway. It is in these early geological horizons that iron-ore deposits are most likely to be found. There has not yet been discovered in Alberta the association or iron-ore with the coal measures that has proved of such utility in Britain.

We believe that this iron-ore question, and its concomitant, the question of an iron industry, is well worth the close attention of Albertans, particularly of those Albertans interested in coal mines. The time may be ripe now for a thorough investigation, if not for the establishment of a commercial plant.

AMERICAN INVESTMENT IN CANADIAN MINES

From the beginning, the mineral industry of Canada has been indebted in large degree to the good offices of neighbours from the United States, both investors and technical men. On the whole, the operations of these friendly neighbours have been successful, and have benefitted both themselves and Canada. This is attested by the present mineral industry of British Columbia, initiated almost completely by Americans, and by the success in Ontario of such concerns as the International Nickel Company, Nipissing Mines, the Dome, and in Quebec, of a number of the Asbestos quarries.

At the beginning, however, the attempts of Americans to develop our mineral resources, particularly in Ontario, were just a crude and failed of success just as frequently as have those of a certain part of the succeeding generation of Canadians, whose futile efforts still continue. The gold boom of Ontario, twenty to twenty-five years ago, left a hole in many an American pocket-book, and blasted the hopes of many a would-be miner from across the border. What we wish to emphasize now, by contrast, is the rational basis for mining investment now adopted by those of our neighbours that are still actively interested in Canada—and interested to a growing extent.

Of late years, and particularly quite recently, the flow of money northward across the border for the purpose of developing Canadian mineral areas has been directed principally by men well experienced in mining. The consequence has been that, in due time, the tide has turned, and the in-flow of money accruing from these investments has yielded a very handsome return. In fact this return has proved to be so satisfactory that these same mining investors are searching, consistently and continuously, for opportunities of re-investment in Canadian mines, and their numbers are being augmented by many investors new to Canada. This speaks well, not only for our mineral resources, but for the discretion with which these investors have applied their money.

We Canadians may well study the methods by which our neighbours have built up this remunerative mining business in our midst. We are, roughly, about a generation behind them in mining experience and can profit not

only by their mistakes, to avoid them, but by the sound methods they have worked out, to emulate them.

The first and obvious point about these operations is that stock-jobbing has no part in them. The initial risk is assumed altogether by men that can afford to lose all they have invested, and as they are usually men of considerable means, a syndicate of workable dimensions can provide a very large sum for development work. Once a paying mineral deposit of large dimensions is proved, then it is sound policy to let the public participate in the venture, even if only to a small extent. This is the principal reason that so many sound mining concerns that began as syndicates are now public companies, with stock listed on the exchanges. A lesser use may be made of a profitable mine, through the stock exchanges, but with that we have no concern just here.

Another prominent feature of this well organized work of exploration and development is that only well trained and competent engineers are entrusted with the expenditure of the large sums of money available. It is evidently a hard lesson to learn that a miner, just as a doctor or a lawyer, must be not only carefully trained, but well-seasoned by experience before he can be entrusted safely with the administration of a responsible position. We Canadians still employ far too many misfits, irresponsible enthusiasts, and demonstrable fakers in our mining industry.

Gradually the efficient type of mining investor is coming to the fore in Canada. We have a number of men who have made fortunes in mining, and are reinvesting in the same and well ordered way that is bound to bring a good return. But these few cannot by any means grasp all the opportunities offered on the mining lands of our broad Dominion. We need the aid of outside investors of the right stamp. It is a great satisfaction to find that the mining investors of the United States who are seeking opportunities in Canada are overwhelming numbers are of the genuine sort that will assist in establishing and retaining the high ideals of our mining profession.

A POLITICAL EXECUTIVE

Shortly after the members of the new cabinet gathered in Ottawa last winter, one of the associates of the Honourable Charles Stewart, Minister of Mines and various other natural resources, remarked that he was "the pick of the bunch". This was after the two had had a month's hard work together. Mr. Stewart's subsequent activities have done much to justify this conclusion.

It is positively a treat to have in charge of the Department of Mines in Ottawa a man who not only is thoroughly interested in the administration of his Department's affairs, but is taking an active part in examining the natural resources for which he is responsible to his country and is likewise working out sound and practical expedients to direct and control their use. Mr. Stewart brings to this task the wide vision, the sound judgment and the energy of a business executive of first rate capacity. We see no evidence that he allows political tinkering or trimming to interfere with the prompt and business-like discharge of the duties he has assumed at the behest of his countrymen.

It is high time that we Canadians showed a more definite and decided appreciation of public service such as that now being rendered by Mr. Stewart. We have become so inured to the false coin of talking, trimming and political tattle that we are almost ready to let it pass current for gold. Here we have a man, high in our public service, who values the truth, and is not ashamed to own it; who is ready to make a decision, and then to act upon it; who puts the public interest above private gain. We of the mining industry may well be proud to have such a man representing our interests in Ottawa. Let us, individually and collectively, make it known that his are the qualities that the men of the mining industry require of a political administrator.

EDITORIAL NOTE

Today we quote the conclusion of a practical field geologist about the iron ranges of central Canada. Though Mr. Willmott made this statement eighteen years ago, it applies almost with equal force today. Since that time a good deal of money has been spent on the exploration of the iron ranges, but the sum is not at all commensurate with their extent. It is easy to be wise after the event; but a good deal of the money and time was spent injudiciously, where there was little or no hope of finding commercial ore bodies. There still remains, as we are told on most competent authority on another page, a chance of finding such ore bodies in ranges and parts of ranges still unexplored. This merits the serious attention of those interested in iron ore, and especially of those in Canada who are now drawing their supply of ore from the United States. The advances in geological science make it possible to explore for such ore-bodies in a much more rational and economical way today than was the case even a few years ago.

PASSIONATE PLAINT OF THE PUBLICITY SHUNNING MINING ENGINEER

I've seen his name in print
Id nauseam and *ad infin*
That I'm as good as he,
Don't matter one small pin
He gets the early worm,
The late one, too, I ween,
And I would judge he gets
Most those that come between
How does he turn the trick?
How does he bag the prize?
The answer simply is
The blighter advertises!"

ANON

Ring The Bell

Twenty-odd years ago gold mining in Nova Scotia had fallen into a state of innocuous desuetude. There were those who still believed in its possibilities; there were also those who were willing to implement that belief by spending money, and there were, as always, those who were more than willing to spend other people's money. Yet there was then, and I believe there is yet, a sturdy, practical, minority holding fast the conviction based on hard experience, that certain areas in Nova Scotia's gold fields would respond to the right kind of development. This small minority was made up of workers who rarely, if ever, blossomed into print, and who, indeed, for the most part preserved a silence induced by disappointment and disgust.

When, in the year 1904, Mr. T. A. Rickard made his report on the industry for the Provincial government and when that report was—well—not exactly suppressed, but certainly not given publicity to any large or varied extent, Nova Scotian gold mining received what is known amongst Mr. Dempsey's friends as a "technical knockout." Its supporters, however, did not throw the sponge in the ring. Unfortunately, also they didn't do anything else. Hence a once possible contender is still weaving round the squared circle in a lamentably groggy condition, with no referee on hand to prevent further punishment. It is high time that someone interfered.

* * *

The present writer firmly believes that, were Mr. Rickard to report on Nova Scotia's gold mines to-day, his conclusions and recommendations would be different in tone and, perhaps, more encouraging than those of his former report.

The last eighteen years have brought phenomenal and radical improvements in mining and milling practice. During this period also, the mining geologist has sprung into existence. And it is an acknowledged fact that Mr. Rickard did not pretend to make an exhaustive investigation of the whole field, nor, indeed, was he asked or expected to do so. It is not logical, therefore, to accept his diagnosis as the final word. Mr. Rickard himself would be the first to concur in the statement that no responsible engineer could formally and finally damn Nova Scotia's gold districts unless he had spent years in each of them.

The present Provincial government has held the reins for many, many years. Unlike the average long-lived government, its tenure of power seems ever firmer now than it did in its youth and middle age. Its revenue is very largely derived from mining (not gold mining). The areal and general geology of the province has been well attended to by the Dominion Geological Survey. With ample material at hand and the world hungry for gold, Premier Murray and his colleagues have much reason to do their best to galvanize into life an industry that, though now pernicious-anaemic, may need only an infusion of the same life-giving current that it once supplied in plenty to the Provincial coffers.

Whatever one's point of view may be, a 90 per cent. disability member of the industrial household is no blooming asset. Hook-worm, sleeping sickness, low vitality, incipient t. b., are all amenable to proper treatment.

The compiler of the Annual Report of the Nova Scotia Department of Mines is hard put to it to fill a few tenuous pages with notes concerning gold mining.

It would be a bold and telling stroke for the essentially paternal Murray government to remove the semi-unconscious fighter, have a searching medical examination followed by a modern course of training, and then place him in the ring to meet his fate with some little chance of breaking even. This fighting at "catch" weights isn't all its cracked up to be. One of the contenders in the encounter of 1904 hadn't a look-in from the first.

The moral is plain, in spite of very badly mixed metaphors. Death and burial are more to be desired than vacillating doubt. The present state of affairs is tantamount to lingering homicide. Anything else were better!

CAPRICORN

COAL PRODUCTION IN UNITED STATES

The United States Geological Survey reports that, instead of the 9,400,000 tons suggested by the first reports, final returns on soft coal production show only 9,142,000 tons in the week ended September 2. The record of the week was awaited with interest as an indication of the supply to be expected after general resumption of mining under the Cleveland agreement. In the present week (September 4-9), because of the Labor Day holiday, the output can hardly exceed 8,700,000 tons.

Production of anthracite, though expected shortly, has not yet been resumed.

The limiting factor in the supply of soft coal has now become transportation. It is true that some thousands of miners are still on strike, notably in the Connelsville and Kanawha districts, but the tonnage offered for shipment by the other mines at work will absorb the available transportation facilities. The demand for coal is active and prices are high. Under such conditions coal is offered for shipment up to the limit of the ability of the railroads to transport it.

The present rate of production is 9,600,000 tons a week. In the corresponding period of 1920 the average was 11,750,000 tons; in 1919, 11,340,000 tons; and in 1918, about 12,800,000 tons. The present rate of soft coal movement, even with priority in use of open-top cars, is therefore 25 per cent. below 1918, 15 per cent below 1919, and 18 per cent below 1920.

The value of the silver mined in Mexico from the first years of the Spanish conquest — 1521 — to January 1922, reached the enormous total of 6,000,000,000 pesos, or $3,000,000,000 in American currency, according to figures made public by the Mexican Embassy, London, state Samuel Montagu & Co., in their weekly letter on bullion. Considered by weight, Mexico has produced somewhat more than 155,000 tons of silver. Over the four-century period the annual production has averaged 40,000,000 pesos; since 1900 the average has been 74,000,000 pesos; this includes the ten year revolutionary period of 1911-21, when silver mining activities were greatly hampered, and in some instances entirely arrested. Now that the country is in a more peaceful state, it is expected that production will mount to new high figures.

Hollinger A Golden Machine Gun

Commanding the Position and Making its own Precious Ammunition

By ALEXANDER GRAY

Having been accorded access to current operating results of the Hollinger Consolidated Gold Mines, with the figures before me, I am reminded of the not always sage counsel: "Git a' plenty whin y'ir git in"

That sort of a thing can be done—and overdone—but with Hollinger it almost seems as though it is being undertaken according to the plans for larger milling capacity. This fact, together with the production at the Dome and McIntyre, as well as the no less satisfactory developments throughout the Kirkland Lake areas, where "big" money is busy, make the Gold Fields of Northern Ontario more than ever magnetic.

Porcupine's three milling companies are making wealth at the rate of over $1,500,000 per month and Kirkland Lake's five producers are increasing interest, not only by reason of their advancing output but because of the positive proofs that values are improving with depth.

As results and the 4000ft quantities are the basis of credit it is to be expected, therefore, that the advent of Nipissing and Continental Mines at Kirkland will lead to more rapid development. Nor are the areas adjacent to Porcupine being overlooked particularly those of the Pearl Lake section and wherever the shear zones are prominent, east and southwest of The Dome.

Kirkland Lake, owing to the decision of Nipissing to investigate other areas further east from Gull Lake and of Continental Mines to hasten their exploratory work, has all the incentive required in such a demonstration as the following affords:

Hollinger July-August Figures

	Four Weeks To July 15	Four Weeks To August 12
Tons Milled	120,095	119,672
Gross Value	$912,949.43	$1,058,812.84
Value Recovered	954,677.71	1,018,200.97
Average per ton	$8.26	$8.85
Profit	$517,895.82	$ 536,122.02
Average tons milled per day	1,289	1,274

Taking the gross value of the 239,767 tons milled in those two four-weekly periods, it is evident the Hollinger company has been mechanically shooting golden bullets at the rate of $21.52 per minute. The results illustrate the significance of the homely aphorism, "Git a' plenty whin y'ir gittin'".

This left the Hollinger Company with this exhibit for the eight four-weekly periods beginning January 1st and ending August 12:

The Year to August 12

Tons Milled	120,095	119,672
Gross Value		$7,918,694.67
Value Recovered		7,642,433.80
Average Value		$8.75
Profit		$4,089,287.28
Surplus		$6,027,297.02
Tons Milled per day		4,040
Average Cost per ton		$4.37

As the profit earned in the eight periods was over 16 per cent. on issued capital, it remains to forcast the outlook for the year as a whole. Assuming the tonnage milled during the remaining five periods will equal that of the four weeks of August, then the total crushing for 1921 will be 1,503,257 tons. If the same average grade is milled, then the gross production should be $13,112,904, and the total recovery $12,733,115.

Significance of Larger Operations

Hollinger operations provide their own [illegible]. When the greater mill is ready, relative economies will be in effect and the entire North Country will have the benefit of its influence. It has been foreseen that larger areas will protect milling requirements [illegible] years. Dome Mines adopted early the policy of merging and its acreage is all sufficient. McIntyre is a group. It is no disparagement to say so, and perhaps it could not have been done otherwise. But Kirkland Lake's producing properties might have prospered more quickly had there been combination and centralized milling. In a sense, the smaller companies [illegible]

"The Golden Stairway"

Since the exciting days of Cobalt, there has been no picturesque talk of sidewalks. "Silver Sidewalks"—probably they proved slippery. Momentarily there was a "Golden Sidewalk" at the Dome. Perhaps, therefore, this Golden Stairway is in order in view of what is transpiring at Porcupine, Kirkland Lake and elsewhere.

[illegible]	$ 5,414,486
[illegible]	4,558,518
[illegible]	5,059,767
[illegible]	8,501,393
[illegible]	10,839,254
[illegible]	5,695,748
[illegible]	9,209,489
[illegible]	10,451,700
[illegible]	13,836,913
[illegible]	14,934,082
[illegible]	25,000,000
Total	$117,496,613

While 53¼ per cent. of that has been produced by the Hollinger Company, 11¼ per cent. has come from Dome Mines, and nearly 13 per cent. from McIntyre. The showing made by Kirkland Lake does not measure up to that of the older Porcupine Camp but its mines were caught in War-time cross-currents and the mishaps attending initial operations in most fields were here discouraging to capital until the real potentialities of the producing and prospective sections became apparent. It is pertinent to emphasize in this connection that Kirkland Lake to the end of 1922, notwithstanding delays in development and the small mills, will have produced three times as much gold as was reported for the whole Province of Ontario prior to 1911.

the more popular and no less beneficial; yet the tendency is toward the elimination of duplications. Therein is the future assured, for if lean sections do not suffice, combined sections are more apt to make up for the deficiencies.

Kirkland Lake, therefore, is likely to be the scene of greater milling plants, such producers as the Wright-Hargreaves, Lake Shore, and now the Teck-Hughes, having indicated the possibilities of those fields. Should the Nipissing Company find what it is after (and it is sincerely hoped it will) friendly rivalry between it and the Continental Mines for milling supremacy would be worth more than "big days" on Mining Stock Exchanges. Were Custom Mills the vogue in the North Country, there could be a chain of producers. Failing that, the presence of Nipissing and the Continental people in Kirkland Lake may balance the odds now in favor of the senior camp, with its Hollinger, Dome and McIntyre.

There is pollen for a good many ventures in the producing areas. Competition such as now is being displayed, reinforced with capital provided by those who can afford to play with it, is making the Porcupine and Kirkland Lake fields more than light-weight speculators comprehend.

Along with this is the unique record of Hollinger. If the prevailing market price of Hollinger is availed of, each 100 shares purchased at $5 has enabled the owner to pocket $1,850 in dividends and $5,000 in the market.

However, that is dangerous ground — and only "the rich — they ride in chaises".

Dome's Record to Date

While commenting on Hollinger's record it is interesting to note what Dome has done to date. The Dome Mines have paid $2,844,259. in dividends and $473,431 return of capital — $3,317,690 in all. This is 97.6 per cent. of the original capital issued.

Some Mines and Prospects of the Coast Range

In the course of his summer's field work, Wm. M. Brewer, Resident Mining Engineer with headquarters at Nanaimo, B. C., has made an inspection of parts of the Coast Range region on the southern mainland coast of the Province. He paid particular attention to ore occurrences and is of the opinion that this section offers considerable opportunity to the prospector and mine operator. In a brief and interesting account of the Coast Range Mr. Brewer says:

Reginald Aldworth Daly in Memoir 38, *Geology of North American Cordillera at the Forty-ninth Parallel*, states: "In British Columbia the late Dr. Dawson adopted the name of "Coast Range" to enforce the view that the granitic schist of British Columbia Mountains on the seaboard should be distinguished from the lava-built Cascades as originally named at the Columbia River, and that name, "Coast Range," has survived and is in fact the only name officially approved by the Geographical Board of Canada for any principal division of the Cordillera."

Geological Reports

Practically the only work reported on the Coast Range by the Geological Survey is in Memoir 23, *Geology of the Coast and Islands between the Strait of Georgia and Queen Charlotte Sound, B. C.*, by J. Austen Bancroft, Canadian Department of Mines, Geological Survey, 1913, and the report of Dr Charles Camsell on his reconnaissance along the line of the P. G. E. Ry. published in the Geological Survey Summary, 1917. In describing the extent of the Coast Range, Mr. Bancroft says as follows:

"West of the Interior Plateau the rugged Coast Range borders the Pacific Ocean for a distance of 900 miles, extending in a N. N. W. direction from the Fraser River valley on the south to the head of Lynn Canal. It continues northward, passing behind the St. Elias Range of Alaska, where it gradually blends with the Interior Plateau at Lake Kluane in longitude 138° 30′ near the boundary line between the Yukon Territory and Alaska. In southern British Columbia these mountains maintain a width of about 100 miles, which diminishes to about 50 miles at the Lynn canal. It is not, however, easy to assign definite boundary lines to them, for they shade off into Interior Plateau conditions on the east, and are closely related in their geological and physiographic developments to many of the Islands on the Pacific Coast. The length and breadth of this range is coincident with the main portion of the great series of batholiths, composed of granites, diorites, gabbros, etc., of remarkably uniform texture, which were intruded probably during late Jurassic time."

It has only been within the last few years that the Coast Range has been visited to any extent by prospectors. This is accounted for by the fact that geological maps of the western part of British Columbia show the Coast Range to be made up of a great mass of eruptive rock, mainly granodiorite, forming a belt from 60 to 100 miles wide, which gave prospectors the idea that there was little to be gained by attempting to explore the Granite Mountains.

Dr. Camsell "Discovers" Coast Range

However in 1917 Dr. Charles Camsell, the present Deputy Minister of Mines at Ottawa, made a reconnaissance along the line of the Pacific Great Eastern Railway, which practically cross-cuts the mountain range. He described the conditions there as follows:

"In the section across the Coast mountains along the Pacific Great Eastern railway such a simple condition does not exist, but instead there are several broad bands of stratified rocks—schists, quartzites, argilites and limestones,—which lie in the granodiorite and are intruded by it. These bands are remnants of the old cover of the granodiorite batholith, which were not destroyed at the time of intrusion nor removed by later erosions. They all strike parallel with the trend of the range, and, consequently their greatest dimension is in a northwesterly direction and their shortest along the line of railway. The contacts of these bands of stratified rocks with the granodiorite are all more or less mineralized. The lateral contracts are mineralized mainly by copper ores, and on the roof contacts, that is where the batholith plunges northwesterly or southeasterly under a roof of stratified rocks, the mineralization is often by the more precious metals.

"The significance of the discovery that large bands of sedimentary and other stratified rocks lie in what was formerly supposed to be nothing but a mass of granodiorite in the Coast mountains is far-reaching, and it is only fair to assume that the other sections through these mountains northward to the Yukon boundary will reveal the same conditions to a greater or less extent. The conditions are most favorable for the occurrence of

metallic deposits of copper, lead, zinc, gold and silver and the whole interior of the Coast mountains of British Columbia therefore becomes an excellent field for prospecting, and not only the eastern and western borders as was formerly believed to be the case."

The First Prospects

The earliest prospecting work recorded in the Coast Range is near the head of Salmon Arm of Seechelt Inlet, where copper ore of bornite variety was discovered in the early seventies, the prospects were known as the "Howe Sound" mine and worked for a time, the ore being brought down the mountains by Indians and some of it shipped to Swansea. The next prospect recorded was on the easterly boundary of the granodiorite batholith near the town of Hope at an elevation of about forty-five hundred feet, where the ore carries principally silver values and occurs very near the contact between the granite rock of the Coast Range and the older sedimentaries of the Interior Plateau. Ore from this prospect, know as the "Eureka" mine, was also carried down the mountain and some of it shipped to Swansea. Both the groups of mineral claims mentioned were owned by Victoria syndicates.

As far as the records show, prospecting on the Coast Range was practically abandoned after the location of the two properties referred to, until 1897, when a party of trappers discovered copper ore on Britannia Mountain about three miles from Howe Sound. Another party discovered copper ore on Hidden Creek, which empties into Observatory Inlet, an arm of the Portland Canal, about six hundred miles in a northwesterly direction from Howe Sound. Both these occurrences of copper ore occur in schist country rock of the type described by Camsell as the remnant of roof pendants.

The next prospecting operations to be carried on in the Coast Range were in the vicinity of Shoal Bay, Phillip's Arm and Frederick Arm, distant about 130 miles northwesterly from Vancouver. It was in this section that gold-bearing quartz veins were discovered, occurring in bands of highly altered stratified rocks.

The "Dorothy Morton", "Douglas Pine," "Alexandra", and "Blue Bell" groups of mineral claims represent some of the prospects on which considerable development work was done, and from the "Dorothy Morton" some ninety thousand dollars in gold and silver bullion was extracted in about eleven months, between December, 1898 and November 1899, when the property was closed down. Work has never been resumed.

Recent Prospecting

In the southerly portion of the Coast Range that is between the Fraser River on the south and Seymour Inlet, opposite the north end of Vancouver Island, a few prospectors have been continuing work diligently during recent years. The result of their work is the discovery of a number of bodies, such as the "Lucky Four" in the Choam Range just south of the Fraser River and about twenty miles east of the Town of Chilliwack. In the "Lucky Four" group the country rock formation is very similar to that of the Britannia mine, but the ore is high-grade chalcopyrite. In addition to the mineralized zone known as the Britannia belt, copper sulphide ores have been discovered on the following groups of mineral claims north of the Fraser River. The "Attorney," "Opporgol" on the easterly side of Howe Sound near Whytecliffe, "Horseshoe" on the westerly side of Howe Sound nearly opposite the Britannia mine, "Brue", "Contact", "McKinnon", and "Radiant" on Ray Creek, a tributary of the Stawamus river near Squamish, "Bowen" on Bowen Island.

From Ray Creek a band of altered stratified rocks consisting of schists, andesites, argillites and some limestone extends more or less continuously in a south easterly direction to the valley of the Indian River, which stream empties into the head of the north arm of Burrard Inlet. In these stratified rocks there are several occurrences of copper ore. The mineral claims on which all these prospects occur have been acquired by the Britannia Mining Company, except the "Bullion-dale" and "Belle" groups near the head of Indian River.

Numerous Copper Prospects Located

Along the line of the Pacific Great Eastern Railway in the vicinity of Brew and Mons Stations there are several chalcopyrite deposits, the most prominent of these being the "Fitzsimmons", "Summit", "Green Tree" and the "Alpha" groups. There is also a deposit of bog iron ore or limonite which occurs near the north end of Alta Lake.

Travelling up the Coast to Jarvis Inlet, copper sulphide ore occurs near Egmont Point, also at the head of Narrows Arm on the Zyoone River, as well as near the head of Salmon Arm, the last having been already referred to as the result of the first prospecting in that section.

On Treasure Mountain, near Vancouver Bay on Jarvis Inlet there are extensive deposits of low-grade copper sulphide ores associated with magnetite, while on the opposite side of Jarvis Inlet about six miles from the mouth of Britain River, outcroppings of high-grade chalcopyrite occur and several mineral claims have been located, known as the "Little" group. At the head of Hotham Sound, an arm of Jarvis Inlet, on the easterly side near its entrance, there are several outcroppings of copper sulphide ores on some of which considerable development work has been done.

In the mountainous country between Powell Lake and Theodosia Arm bands of altered sedimentaries occur in which are found copper sulphide ores carrying low values in gold and silver. On Goat Island in Powell Lake outcroppings of ore of the same character also occur, and similar conditions exist in the mountains adjacent to the Olsen River, as well as near the foot of Powell Lake.

Between Powell River and Lund, deposits of ore in which the chief mineral is zinc occur and have been developed to some extent.

Magnetite, Limestone and Gold

On the northerly part of Redondo Island facing Pryce Channel, there are deposits of magnetic iron ore and limestone of considerable extent, the limestone being quarried for use at the pulp mill at Mill Creek at the head of Howe Sound. On Fanny Bay, Ramsay Arm, there is a deposit of galena and zinc blend. In the vicinity of Frederick and Phillip's Arms, off Cardero Channel, occur the gold bearing quartz veins already referred to, while on Thurlow Island south from Phillip's Arm the "Dawn" group of mineral claims is located, the ore carrying gold and silver values in quartz gangue. Portions of this ore-body carry about 1 oz. in gold and 8 oz. in silver to the ton. Northerly from the last mentioned occurrences near the head of Knight Inlet there are bands of altered sedimentary rocks which have been intruded by the Coast Range granite and in these sedimentaries are found ore bodies carrying chiefly copper sulphide ores.

Between Knight Inlet and Seymour Inlet the entrance of which is on the southerly side at Queen Charlotte Sound there has been but little prospecting done to the present time.

At the head of Seymour Inlet there occur deposits of magnetite of considerable extent.

Coal by Steam-Shovel

We are now well accustomed to the idea of winning iron ore by steam-shovel from open pits; operations on the Mesabi Range of Minnesota have demonstrated its feasibility for two decades. To mine coal by the same up-to-date method is an occurrence well worthy of remark. Dr. D. B. Dowling, of the Dominion Geological Survey, has recently inspected such a coal quarry, and from him the following data have been obtained. Dr. Dowling has spent half a lifetime in studying the geology of the plains and hills of Alberta, and is Canada's specialist in the economic problems of the mineral industry pertaining to that area.

Discovered in Railway Cutting

Bassing, Alberta, 150 miles west of Edmonton on a branch line of the Canadian National Railways, is near the western edge of the huge area of coal-bearing rocks that underlies such a large part of the province. Along the outcrops of the coal-bearing strata there are a number of coal mines. One of the latest there is the Sterling Mine, here described. The coal was discovered accidentally during the construction of the railway, having been exposed in a cutting. It has now been exposed over a considerable area and is being operated consistently.

The coal seam occurs in rocks of Upper Cretaceous, or possibly Tertiary, age. It is a fairly good bituminous coal, being graded as a light steam coal. Essentially it is of the grade best suited to domestic use, but it has been used successfully on the railways during the past summer. No miners are required to win it—only steam-shovellers—so that its operation was not affected by the recent strike of coal miners.

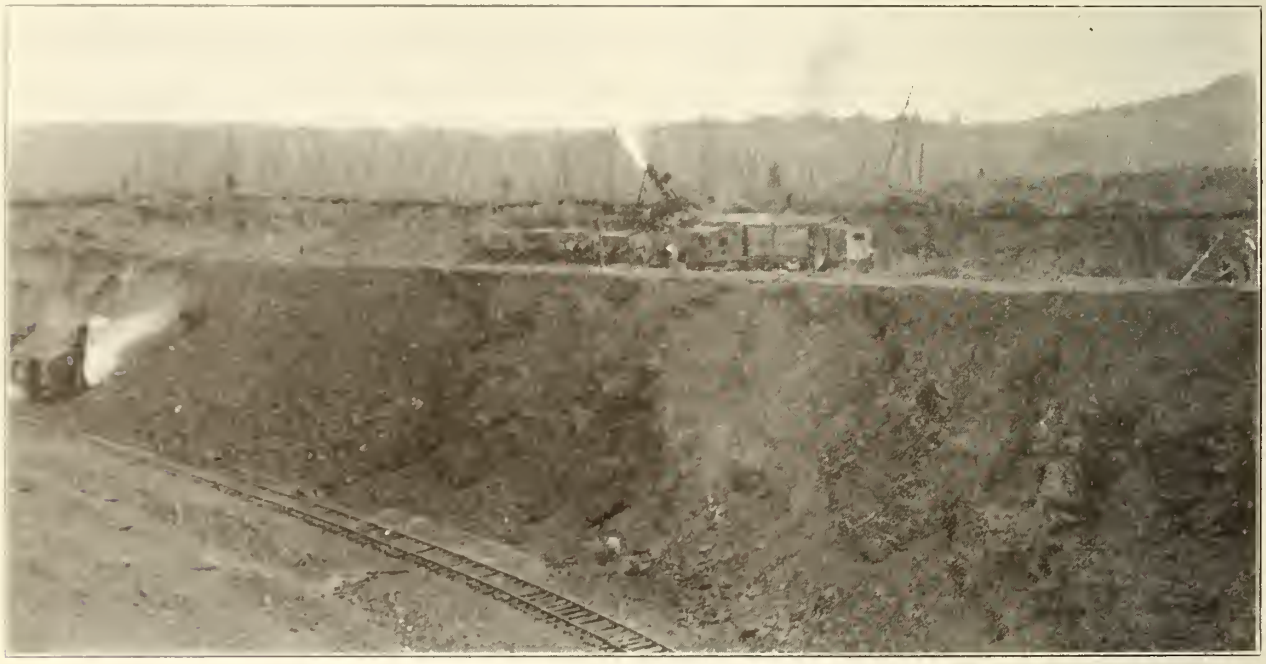
Geological Occurrence

As at present exposed, the bed of coal has an unusual thickness, illustrated in the accompanying sketch. It is covered by a mantle of glacial drift (boulderclay) to a thickness of 15 to 20 feet. This has been stripped sufficiently to disclose a large area of the deposit. A number of bore-holes have been put down to determine the size and limits of the seam, with a result approximately as shown in the sketch. The 90 feet of coal measured vertically beneath the railway track is a maximum it is not expected will be attained elsewhere.

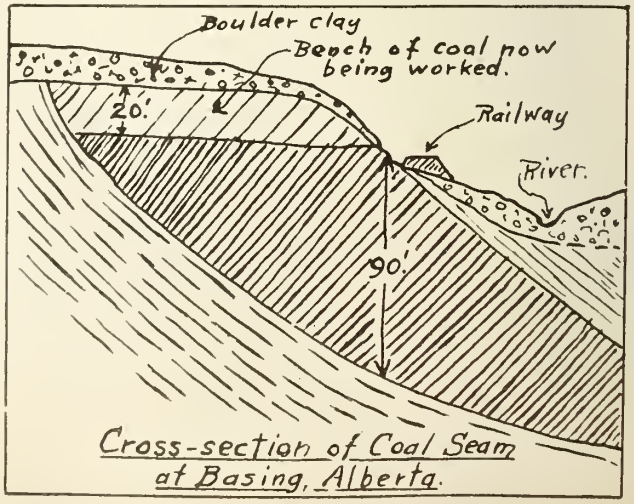
This great thickness of coal is obviously not due to a natural deposition of coal-forming materials. Its origin is suggested by the nearness of the foot-hill of the Rocky Mountains, and a brief geological reconnaissance has confirmed the view that a crustal movement has caused a lateral compression of the original coal bed, with a consequent increase in thickness. It seems likely that a thrust fault at or near the present land surface has caused an overlapping of the hard strata that lie beneath the coal. As coal is much more fluid under pressure than is the rock, instead of being faulted it yielded to the force by flowing, thus assuming its present shape. Numerous well-determined examples of an increment in thickness by this means are available to support this idea.

Twenty-foot Bench of Coal

The coal is being won at present by means of two steamshovels, one to remove the overburden and the other to load railway cars on the level below. A bench of coal twenty feet in depth is now being worked. As shown in the accompanying photo, the coal, after being loosened with explosive, is simply shovelled into dump cars, hauled to the tipple and, after being screened, loaded into cars on the railway siding.



Steam Shovel Above, Removing Overburden; Below, Loading Coal.



Cross-section of Coal Seam at Basing, Alberta.

The Geology Of Ontario's Iron Ores

DISCUSSION AT CONFERENCE ON IRON ORE IN TORONTO

By C. W. KNIGHT and W. H. COLLINS

At the conference on Ontario's iron ore problem, convened on July 5th last in Toronto by Hon. Harry Mills, Minister of Mines, the geology of the Province's iron ore deposits was discussed briefly, first by Mr. C. W. Knight, Assistant Provincial Geologist, and then by Dr. W. H. Collins, Director of the Geological Survey, Ottawa. Their remarks follow:

Mr. Knight's Address

This is rather a large question. I understood from Mr. Gibson he wanted me to say something about the geology of the iron ores in our Province, but this would be like bringing coals to Newcastle. In Ontario we have what is known as the Keewatin series. Unfortunately, the Keewatin series in the United States has not been attractive. The Animike is the main series in the United States, and in it is found the great Mesabi range which has produced about 73 per cent. of the ore of that country. This series in this Province is only two hundred feet thick, and strikes from Loon Lake to the American boundary. In the United States this series is from seven hundred to one thousand feet thick.

Just a word as to the character of the Keewatin ores and the Animike ores. The Keewatin ores are very much altered. They are practically all magnetite, but some are hematite, and they are found largely standing in vertical positions. The Animike rocks are flat lying. It has often been asked why it is that we have so many ores in Ontario which have not been concentrated, while across the line we have these valuable ranges. I think the two men who know more about this than anyone have probably given some of the best reasons. They think the glaciers must have scooped away these ores except in certain spots, the Helen Mine being an instance of the places that escaped the glaciers. That seems to be one of the main reasons why we have not got these ores. Another reason probably is that the structure of the iron formation in this Province has not been the same as in the United States, and also the rich character of the ores themselves is different. The richer ores are found by exploration under the drift and also through the rock, and in this regard our iron formations have not been properly prospected.

Dr. Collins' Address

It seems to me that the question of an adequate iron ore supply for the upkeep of Ontario's iron and steel industry should be considered under two heads: ores that may be considered as primary, that is, ores that were formed in their present state at the time they were laid down; and the concentrated and enriched ores that have formed from these primary ores at some later time. It is to this second class that attention should particularly be directed by the prospector if a supply of ore is to be obtained without resorting to beneficiation. I am perfectly in accord with what Mr. Knight has said about the desirability of further prospecting certain of our primary iron formations for secondary enrichments.

We may group all our known iron ores into six types. The oldest, the Keewatin, is very widespread. We find it all over Northern Ontario, from the extreme west to the east, and as far south as Georgian Bay. This Keewatin iron formation might again be divided into two types, the banded silica and magnetite type, and the second one, really very closely related to it, the carbonate type, which is particularly characteristic of the Michipicoten District. The banded silica and magnetite type is of widespread occurrence. One finds a fairly good inventory of these deposits in the publication known as "Iron Ores of Canada" issued by the Mines Branch of the Federal Department of Mines. It is perhaps sufficient here to say that a good many of these deposits are so extensive that you can conservatively estimate their available contents in tens or hundreds of millions of tons. The only trouble is that they seldom run over thirty-five per cent in iron content and the silica content is too large for satisfactory blast furnace treatment.

Carbonate Ranges Insufficiently Explored

Carbonate formations are more promising sources for secondary concentrations. They consist on one side of banded silica and either carbonate or some form of iron oxide, and on the other side of a carbonate which is really a mixture of iron, lime, magnesia and manganese, scattered through which is a small percentage of pyrite and pyrrhotite. The pyrite, in the presence of oxygen and moisture, forms sulphuric acid. The acid drives off the carbon di-oxide and transforms the carbonate into iron sulphate. This sulphate when carried below ground water level reduces to oxide and becomes thus converted into hematite. The Helen iron ore is a sample of this secondary type of concentration, as are also the Josephine and the Frances. Now I might say that these carbonate formation ranges extend for many miles in the Michipicoten district, and also east of Lake Nipigon. Only a very small percentage, perhaps not more than ten per cent. of the linear extent of these ranges has been adequately prospected for secondary concentrations of the Helen type, which is an excellent ore, running about 55 per cent iron. The primary carbonate, or siderite, was itself mined at the Magpie mine and roasted to drive off the carbon di-oxide and sulphur. The roasted product constituted an excellent ore carrying about fifty per cent iron, no moisture and lime magnesia and silica in proportions that required very little additional fluxing materials.

There is a third type of iron ore deposit, in one of which Mr. Leitch is interested. Iron formation of this type occurs east of Lake Nipigon, and in the Lake Savant district in the northwest corner of Thunder Bay district. This type of deposit consists of a greywacke or hardened mud interbedded with layers of iron ore, in the form of hematite and magnetite. Iron formations of this type do not ordinarily contain more than forty per cent of iron, and they are highly siliceous and do not furnish in the natural state an ore suited for smelting. In their present state the iron oxides are not in suitable mineralogical form for natural concentration. If natural concentration has taken place, it was a long time ago, and the search for concentrations is going to be a difficult matter that will require all our available resources for examination.

Iron Ore in Animike Formation

The next type is the Animike formation, which in the United States has produced the great Mesabi deposits. We have this Mesabi type of iron formation, although

thinly, in two places. One of these has just been mentioned by Mr. Knight, in the Port Arthur district. Another one not belonging to Ontario is in the Belcher Islands, Hudson Bay. If, however, the Belcher Islands iron deposits are ever developed, it is quite possible that Ontario will benefit. These Belcher Islands deposits were examined last summer by a Government survey party, and they have been examined several times before, in the interests of Sir William Mackenzie and others. The results of last year's examination, which was confined to the eastern part of the Islands, indicate that there are 158 square miles underlain by the iron formation. The formation has a linear outcrop of 110 miles, and the ore itself ranges from a content of metallic iron of 52 per cent. down to about 35 per cent. Some of the analyses may be of interest to the meeting. The first one is from a bed two feet thick only, largely of magnetite, the metallic content of which is from 52 to 40 per cent, virtually no lime, magnesia or manganese, sulphur 0.1 and phosphorous 0.09. Unfortunately silica is about 24 per cent. The second bed, immediately underlying, and 11 feet thick, contains 45 per cent. of metallic iron, but 32½ per cent. of silica. The third bed, 12 feet thick, carries 39 per cent. of metallic iron, and 28½ per cent. of silica. The fourth band, fifteen feet thick, contains 35½ per cent. of iron and 46½ of silica. These ores are magnetite and the silica is interbanded in such a way that mechanical separation would be rather difficult. These are believed to be largely primary ores. The original ores were iron silicate and not very suitable for natural concentration and there is not much evidence that concentration has taken place. These ores are, however, of enormous extent, and there is a possibility of there being concentrations, although how these concentrations are to be located is no easy problem. The formations lie flat.

Minor Occurrences

A fourth type of iron ore deposit is that which occurs interbedded in the Lorrain quartzite and Gowganda formations along the north shore of Lake Huron. These are comparatively small deposits of hematite not capable of yielding any important tonnages of ore.

The fifth type is likewise of little commercial importance, so far as yet known. It comprises hematite deposits, both specular and massive varieties, which was apparently deposited along with the first sand and gravel of the St. Mary's sandstone which occurs near Sault Ste. Marie, and along the north shore and islands of Lake Huron. In some cases the iron oxide is a part of the St. Mary's sandstone and too impure to be an ore. In a few cases it appears to have accumulated in a purer state in crevices in the underlying floor of Huronian formations. The old Stobie mine near Gordon Lake is an example of these fissure fillings from which ore was formerly mined.

The iron ore deposits of eastern Ontario include various deposits of high iron content but, generally speaking, of small dimensions. These deposits, however, are too complex, geologically, to be described with any degree of success in the short time at my present disposal.

News of Mining

Great Britain

The former secretary of the Sankey Commission, Mr. A. D. McNair, some weeks ago read a paper at Oxford on the "Problem of the minets". Mr. McNair strongly urged the acquisition of all mining royalties by the State. This he considered a pre-essential to adequate state supervision. There should be, he believed, a national mining board, empowered to grant leases. Consolidation of collieries is also, in his opinion, a crying need, as is also complete publicity as to the financial management of individual collieries.

The result of the conference of representatives of the Patent Offices of the Dominions, held at the Patent Office, London, is the unanimous decision that a British Empire patent is desirable and practicable. A central office for the examination and granting of British Empire patents is to be established provisionally. It was agreed that uniform practice should obtain throughout the Empire.

Although the calculated total loss to Scottish coal mine operators, under the minimum Wage Agreement, amounted to £44,493 during last May, they were permitted to carry forward a deficiency of only £16,919. The latter sum is taken as representing the irrecoverable loss.

Production of pig-iron in great Britain amounted to 399,100 tons during July, an increase of 30,000 tons over the output for June. The monthly average during the year 1913 was 855,000 tons.

For the quarter ending July 1st, 1922, coal production in Great Britain amounted to 57,552,000 tons, as compared with 62,202,000 tons for the immediately preceding quarter. The output of coal per man-shift worked, was about 19.5 cwt. for each quarter. The average declared f.o.b. price per ton of export coal was 22s. 11d. during June. 232 persons were killed during the second quarter of 1922 and 1,097 seriously injured 1,089,700 wage earners were employed.

During the last 12 months no less than four successive reductions in the prices of explosives have been announced in Great Britain. The aggregate reduction represents about 20 per cent. on the price current a year ago.

United States

According to figures recently made public by the United States Bureau of the Census, there were, in the year 1919, 21,280 producing mining enterprises in the United States. The number of wage-earners was 981,500. The power equipment in use represented 6,750,000 h.p. The invested capital approximated $7,000,000,000. Working and other expenses aggregated about $2,500,000 during the year. Of this sum, $311,000,000, or 12.44 per cent., went into development work. In the total number of wage earners employed, those working for non-producing enterprises represent only six-tenths of one per cent. of the whole. Wages totalled $1,300,000,000; salaries, $152,000,000. The value of products was $3,175,000,000. This is an increase of 150 per cent. over the value estimated for products in 1909.

Europe

Figures of Germany coal, lignite, and coke for the first half of 1922 are now available. They are as follows:—Coal, 67,220,982 tons; lignite, 54,051,229 tons; coke, 14,404,406 tons. All three returns are considerably higher than those for the corresponding period of 1921.

The Asturian (Spain) coal miners' strike has been arbitrated by the Minister of Mines. The minister's chief stipulations are, first, that work must be resumed without compensation for losses; second, that wages be reduced 5 per cent.; third, that if the output be increased

by 20 per cent. before November 1st the reduction in wages will be no longer effective. The miners had previously offered to bring the output up by 10 per cent.

The annual report of the Luxemburg Chamber of Commerce, in reviewing the Luxemburg iron industry, complains that it "has been forced into a subordinate position in the world's markets in relation to those countries which are favorably situated financially, and which receive subsidies from wealthy governments and give orders in return". It is pointed out that the government of Luxemburg is quite unable to help the struggling industry.

The Belgian coal producers profited greatly during the continuance of the United States coal strike. The fuel briquette trade was also much stimulated.

According to an official statement issued by the French Minister of Public Works, the hydro-electric plants of the country now represent a power capacity of 2,100,000 h.p., an increase of 40 per cent. as compared with last year. Electro-metallurgical and electro-chemical plants absorb 1,300,000 h.p. of this total. Within the next two years additional power, about 300,000 h.p., will be available.

The exports of refined petroleum from Roumania during the first half of 1922 were 102,180 tonnes.

Production of petroleum from the three large fields in Russia, namely, Ural Duba, Baku, and Grozny, during the first six months of the current year amounted to 141,796,000 poods, an increase of 17 per cent. over the production for the corresponding period of 1921.

Announcement is made that the Reichskabinet has authorized the raising of German potash prices by an average of 30 per cent.

Asia

Reports from Bombay bring the information that the Tata Iron and Steel Company's annual statement for the year ending March 31 1922, shows a profit of £588,333 (1881/2 lakhs). On account of trade difficulties encountered during the past 12 months, no dividends are to be paid on the common shares, as it is thought advisable to strengthen the Company's standing by establishing a working reserve.

Australia

The Queensland Department of Mines is equipping a new colliery near the Styx River. Production on a large scale from already opened seams and from four newly discovered seams, will be commenced as soon as railway connection shall have been completed. It is the Government's intention to develop trade with the Far East and the United States. The coal is reported to be excellent in quality.

Africa

During the year ending March 31st, 1922, the Central Mining and Investment Corporation, Limited, reports 186,630 tons of ore milled averaging 6.19 dwt. Costs were 30.s. 10d. per ton, as against 29.s. 1d. per ton during the previous year. The tenor of the ore dropped from 6.74 dwt. to the figure mentioned above. Working profits amounted to £17,251, as compared with £77,700 for the preceding 12 months.

Representations made by the Transvaal Chamber of Mines in the interests of gold mining, and submitted to the Mining Industry Board, reiterate the pressing need of economic reform. Costs, it is stated, must be lowered before the maximum remunerative tonnage can be treated, and before employment can be given to the maximum number of whites and natives. The tremendous importance of the low-grade reserves, at present economically untreatable, was emphatically brought out. It was claimed that these reserves could be made payable if, first, all restrictions were to be removed from the recruiting of native labour, and second, if the efficiency of both white and native labour were brought up to a higher standard. The present reserves of producing mines are estimated at 316 millions of tons, averaging over 6 dwt. per ton. These reserves could be doubled in quantity and profits in the aggregate hugely increased, were costs reduced to a reasonable and possible figure.

For the quarter ending June 30, 1922, silver lead ore milled by Transvaal Silver and Base Metals amounted to 11,866 tons, yielding bullion valued at £46,264. The working profit on this tonnage was £5,362, or 9.03.s. per ton treated.

Owing largely to damage resulting from difficulty of proper mine maintenance during the late strike the Simmer and Jack reports a loss of £7,006 for the quarter ended June 30, 1922.

News and Comments

Encouraging Oil Developments

It is a positive treat to have Minister Stewart at Ottawa publicly proclaim that it is the policy of the Government to assist every legitimate effort to find oil in our West. He deprecates printing press prospecting and over speculation, but that is a concomitant of all adventuring, and the chief thing is to see to it that people with capital are given the helping hand. If influential interests are co-operating in the Lake Pakowki development, so much the better. Heretofore, the impression created was that officials were afraid someone would make some money, and the Government would not get the lion's share. Assuming that Montana operations will lead to success on this side of the line, Minister Stewart is very much to the point — and not leaning barkwards.

The McIntyre Report

It would be trifling with the verities were it to go uncontested that, as sections of the daily press profess, the McIntyre Porcupine Mines report for the fiscal year ended June 30, is "a highly satisfactory document", apart from "a slight reduction" in the profits. Considering the speculative position in the company's shares, and contrasting it with the ore reserve position, there is a hiatus suggesting admonition.

The total of the ore reserve is 718,198 tons averaging $10.37 per ton, amounting to $7,452,467. At $18.50, the market price of the shares, the market value of the 800,000 shares is $14,800,000. While not losing sight of the statement of the very highly thought of General Manager, who is always scrupulously exact, that "Veins Nos. 8, 9 ad 10 have not been developed to a point where we could include them in this year's ore reserves", and conceding the importance of recent deeper developments, the fact remains that the Mc-

hetyre shadow is removed somewhat from the substance.

Without detracting an iota from the optimism regarding McIntyre properties, and reiterating that the management is distinctive in its probity and capability, the speculative aspect on the outside is not quite as pleasant as the showing made on the inside by mines that gained $1,060,073 in the gross value of the ore reserves after contributing 193,971 tons worth $2,074,088.81 in the year on review.

McIntyre Mines now have a producing record of $13,091,717.20, and there is evidence of more to follow, not only throughout the determined vein-systems, but in the particular section held in non-committal reserve by General Manager Ennis, of which he writes:—

"No. 8 Vein System lies 120 feet south of No. 7 Vein and was cut by 13 B crossent on the 1375 foot-level directly under the quartz prophyry. Fifty-four feet of drifting has been done on this vein showing 8 feet of ore assaying $6. On the 1,500-foot level 15 B crossent intersected the vein, showing ore 5 feet wide assaying $6. The following diamond drill holes have intersected No. 8 Vein System:

Hole No.	Horizon	Width	Assay
274	1400	10 ft.	$6.40
190	1475	10 ft.	6.90
266	1550	30 ft.	12.40

"No. 9 Vein System lies 350 feet south of No. 7 and has been intersected by 13 B and 15 B crosscuts. On the 1375 foot level a well-defined vein 10 feet wide was exposed but being in the quartz prophyry contained low values. On the 1560-foot level 7 feet of ore was exposed assaying $6. The following diamond drill holes have intersected No. 9 Vein System.

Hole No.	Horizon	Width	Assay
246	1400	8 ft.	$20.40
281	1575	6 ft.	16.20
266	1650	10 ft.	37.60

"No. 10 Vein System lies 500 feet south of No. 7 Vein System and has been exposed by 13 B crosscut on the 1375-foot level, showing ore 7 feet wid assaying $3.60. 15 B crossent is not advanced far enough to intersect this vein and the territory is now being drilled

Estimated Ore Reserves

	Tons	Assays	Amount
McIntyre Claims	305,257	$10.61	$3,237,496
McIntyre Ext. Cl.	203,764	11.27	2,297,689
Jupiter Claims	79,041	8.29	655,337
Broken in Stopes	130,136	9.69	1,261,945
	718,198	$10.37	$7,452,467

The usual allowances have been made for dilutions due to the inclusion of barren schists and wall-rock. The general Manager knows his mines and has stated his case with commendable conservatism. Vein Systems 8, 9 and 10 are being relied on to maintain the larger production with the greater mill, which should reduce operating costs.

The average cost as given, $6.42, is no more than was expected, in view of the extensive development. It is respectfully to be noted, though, that the item of "administrative and general expenses, Head Office, $85,989.84", equal to 44 cents per ton milled, or 12.3 per cent of operating earnings, exceed the cost of "management and general expenses, Mine Office $68,619.88".

Of the indicated ore, and the potential value of the properties, General Manager Ennis, holds these optimistic views:

"Development work has confirmed the statement made in last year's report that the contact between the basalt and porphyry flattened out and that the area of favorable ore-bearing formation would increase with depth. Vein Systems Nos. 8, 9 and 10 on the 1500 horizon are passing out of the porphyry into underlying basic schists and like No. 7 Vein are expected to increase in values and continuity. It is also probable that as the porphyry recedes eastward other vein systems will be found in this area on lower horizons".

Those opinions are shared by noted scientists who have examined the McIntyre properties on behalf of New York interests. The diamond drilling end work done sustain the assumptions entertained.

Elbow Lake Developments

Options held by individual Hollinger Directors and officials upon the Murray claims at Elbow Lake, Northern Manitoba, having been abandoned others have been acquired by Elbow Lake Mines Corporation — mostly made up of Quebec men, Frederick G. Corning, of New York, Director of The Dome Mines, Vice President Parker of the Canadian Mining Corporation, Robert Sweeny, and others. This arrangement was effected after considerable negotiation. It is undestood the Messrs. Cohen, Mining Engineers, felt that the Murray ground had not been thoroughly tested and so urged further work. An extensive distribution of shares having taken place, and more of it being in progress, anything that will restore confidence in the district will be welcomed. Apart from the surrender of the Murray options, there has been no recent authoritative report on developments. Samuel W. Cohen and Julius Cohen, having actively espoused Elbow Lake, are leaving nothing undone to at least establish the merits or demerits of the zones in which spectacular showings were found. Preliminary disappointments may not be permanently so. The McCuaig, Turner, Rogers, Corning, Parker combination should give the section what it needs, in the opinion of the Messrs. Cohen.

Nipissing Also Quits

The intimation conveyed some time ago that the Nipissing Company of Cobalt was dissatisfied with the results being obtained at their Gordon property, in the Elbow Lake district, was indignantly resented by the over-enthusiastic. The statements made in *The Canadian Mining Journal* that the so-called Hollinger interests had withdrawn their field force, also was denied. When two such combinations of capital and technical abililty spend their own money and retire, it is manifest that this Journal would not have stated the facts unless it was in the interests of the public to make the announcements. There was too much circusing of those interests, by those who had shares to sell. Not that shares do not have to be sold, but simply that it is unwise to ride into popularity upon the shoulders of men who are not ossified from the shoulders up. All of us would be only too delighted to have Elbow Lake more than fulfil the representations made in "bull-bull" advertisements. But alas and alack! Nipissing Engineers and Hollinger Engineers have made a "strategic retreat"!

The Mining Districts

BY THE JOURNAL'S CORRESPONDENTS

NOVA SCOTIA

Mr. McDougall's Timely Compromise

Dr. McKinnon, who mediated the miners' agreement, has paid a glowing tribute to D. H. McDougall. He pointed to the fine spirit shown during the negotiations by the Vice-President, and eulogised him for giving the workmen more than they expected to get. The learned divine means well but he failed to see that his way of putting it might be construed to read that Mr. McDougall gave way more than was necessary. Fine spirit and all that he has, the Vice-President is not noted for giving away his company's money, especially in a time of stringency. What really did happen was that he gave way just in time to save his company from being confronted with other impossible wage rates or a strike over an indefinite period. It is doubtful whether the making of such an agreement could have been accomplished one week later.

Bolshevist Utterances

"He needs must go that the devil drives." President Lavingstone of the United Mine Workers, at a labor demonstration in Sydney on Labor Day, declared that he was a Red Revolutionary; yet to us there is no terror in his threat of Red Russian rule. We have heard such ranting many times before and lived to see the barristers "peep about to find dishonorable graves," when the seed they had sown bore fruit.

Miners Hard at Work Again

With the exception of Sydney Mines, which took an extra day off in sympathy with the striking railway men in the Steel Department, all the collieries of Nova Scotia got away to a good start. Cape Breton and Pictou miners went away with a swing and got into their stride in three or four days, while Springhill miners had the satisfaction of seeing all three collieries open up in full blast. For a long time there was only one colliery working in Springhill and that only a few days per week. There are several months of the open season left during which coal can be poured into the Montreal and other markets to meet the demand, great as it is, and some of the leeway lost can yet be made up.

A few "sorehead" are trying to cause trouble and stir up strife over the 1921 rates. These agitators claim that Nova Scotia miners, in order to remain on a level with the American miners, should have retained the 1921 rates. They are, however, weak in logic, for the Americans came out on strike to hold the 1920 rates. Nova Scotia miners at the same time received an increase in 1920 and the granting of the Montreal pact, in 1921, was additional, against which the American miners received no equivalent.

Fire in Inverness Colliery

Inverness sent out a call to the Draeger corps of Glace Bay and Stellarton to help them in an attempt to put out a mine fire. The leaders and their men got ready to depart with their equipment when news came that the fire was under control. It seems that the fire occurred at No. 10 Level East and was simply an old fire broken out again. Stoppings were built and the fire section walled off, and other sections of the mine worked as usual the following day.

Handling the Underground Floods

When on August 15th the firemen, pumpsmen and engineers quit work, the Coal Company made a mighty effort to do the work of these men, but in spite of all they were able to do the collieries began to fill up with water. It was here that the public began to realize what there was and always is to contend with in operating the Nova Scotia collieries. And it was here that the efficient management of the collieries and their far-sighted policy showed at its best. Every mine as far as it was possible was equipped for emergencies, and when the pumps ceased the great underground lodgments began to take care of the fast accumulating waters. These lodgments, which are simply concrete dams, built into the solid coal, are made to contain all the way from two to eight million gallons of water. Some of them may hold a week's water, others more and others less. Usually in the summer season the mine makes little water, but this summer was unusually wet and the inflow of water was very heavy. To those who understand what this meant, the case looked most serious, and there was grave concern about losing the lower workings of some collieries. The reports sent out every day aroused the Provincial Government and forced it to act, but they were none too soon, for some lodgments were running over when the regular pumpsmen returned to work at the end of six days, and in some of the collieries a number of the lower places will be under water for some time to come.

Clearing the Mines of Gas

The pumping capacity of each mine is more than adequate to handle the daily inflow and well equipped pumping stations are properly placed to handle the large bodies of water. Most of the collieries were ready in a few days to resume operations, having been cleared from both mine gas and water. When the management realized that the collieries might be permitted to fill up with water and gas, arrangements were immediately made looking to the time when both of these elements would have to be removed, and when the time came to clear away the gas, it was a comparatively easy matter, although some collieries were filled almost to the mouths of the slopes. As soon as possible afterwards the mines were inspected and reports made.

The inspection of a coal mine is an all important matter and mining laws lay such emphasis on mine inspection that examination is going on all the time, both day and night. The examination for mine gas is most interesting at any time, but more so after one knows that for a time the mine has been simply one large gasometer with enough explosive mixture to "blow the roof off," to use a common mining expression. So the greatest care was taken in entering and in making the examinations of the Nova Scotia Collieries when the recent strike was declared off. Samples of the mine gas were taken from different sections of the different collieries, and samples of the mine atmosphere were gathered after the gas had been carried off in the air currents. Temperature readings were made

and much data gathered that under ordinary work day conditions could not be obtained. An analysis of these samples may later on furnish interesting and instructive information to students of mining.

The Safety Lamps

In preparing to enter a mine the safety lamp is first examined and thoroughly tested. Recent experiences in Cape Breton collieries have placed the safety lamp under careful observation. It is fully realized that defective lamps are all the more dangerous because they are known as safety lamps. One week of damp weather during the strike had left a little rust on the gauze. This had to be removed and other parts thoroughly cleaned. For that wonderful principle, discovered by Humphrey Davy, over one hundred years ago, on which he constructed the safety lamp is never for one moment forgotten by the careful miner. It is a remarkable fact that while safety lamps have undergone many changes in construction since the first one was made, which have made them more efficient, yet so thoroughly did that painstaking scientist of the past do his work that the principle has never been improved upon. The electric light is an improvement in giving better light, but it is not a gas detector and can only be used after the safety lamp has proved conditions suitable for working.

The Mine Examiners

The examination of a coal mine can only be made by certificated examiners. These are usually men of wide experience selected for that purpose. The Mines Regulation Act states the qualification of the examiners and the duties they are to perform. They are "to have the general charge of the safety of the mine; to make such inspection and carry out such other duties as to the presence of gas, ventilation, state of roof and sides, as required by the act and by any special rules."

Primarily the duty of the mine examiner was to examine the mine for gas. The examination of the roof was later on linked up as a natural result of inspection, but the fact that examiners must carry safety detectors, such as the Keohler or some other reliable lamp attests that their first duty is to search for gas. In the early days when miners were merely learning by the hard experience of gas explosions, both on a small and large scale, that the examiner must be thorough in his work, the same emphasis was not laid on careful examination as is done today, although there were then faithful men who did their duty. The writer remembers an instance of one examiner who had a considerable time to wait before he could make his examination. His shift was up and the miner who delayed him told him to go home and after he finished he would make the examination. Quick as lightning came the reply that he could not do so, for he would have to write a report, and when he wrote it he wanted to be in a position to say that it was true. In the same mine was another examiner, who, when he passed up through the section of a miner whom he knew to be careful, said, "Well, I am glad to see you, for while you are here—I won't have to come through your section." But within two months several miners were burnt by gas explosion in this man's section, and he lost his job, while the other examiner rose to be mine manager and is today just as loyal and faithful to duty as ever.

225,000 Tons in One Shot

One of the largest shots in mining operations in this part of the world was fired at Port Au Port, Newfoundland on the tenth of last month, in the Limestone quarry of the Dominion Iron and Steel Company. The quarry face varies from ninety to one hundred feet in height and it was planned to shoot down a section thirty feet wide for a distance of seven hundred feet.

Churn drill holes five and five-eights inches in diameter were placed thirty feet back from the face and to a depth varying from one hundred to one hundred and ten feet. These holes were placed at thirty-foot centres and a charge of eight and one-quarter tons of dynamite distributed among them, twenty-seven in number. The lower part of the holes was charged with sixty per cent dynamite and the balance with forty per cent. Each hole was primed with three number eight detonators, each on an independent parallel circuit, and the entire charge was exploded by firing from the main power line carrying two hundred and fifty volts.

The break along the line of holes was almost perfect, one-half the hole being plainly seen in the face after the shot was fired. The lower or shore part of the face, however, came away with the shot and caused a run of stone that brought the total quantity up to two hundred and twenty-five thousand tons.

This quarry was opened up in 1912, but little was done until the present year. The rock is a close-grained, compact crystalline limestone, and is hard to drill; but the close texture makes almost perfect blasting possible. Of the rock shot down seventy per cent. will be handled by the steam shovel without further blasting.

Wabana Iron Ore Exports

Iron ore to the amount of two hundred and ten thousand tons was shipped from Wabana during the month of August to European ports. This was the largest quantity shipped in any one month to foreign countries. The mines are in excellent condition and are producing at the rate of from three to four thousand tons per day. There are seventeen hundred men employed, which is a normal summer force. Shipments to Sydney have so far continued uninterrupted and by the end of the shipping season stock piles will be large.

NORTHERN ONTARIO

The O'Brien Mill Lost

On Labor Day, September 4th, the O'Brien Mill, motor shop and No. 1 shaft house were completed destroyed by fire, with an estimated loss of approximately a quarter of a million dollars. Fire broke out in an electric drier and rapidly spread through the whole plant. As it was Labor holiday there were very few men around the plant, and when the fire department did get into action it was found that the valve inside the mill had been left open and very little pressure could be obtained. It is understood that in addition to the solutions in the mill, there was a considerable quantity of concentrate on hand, and no doubt a large part of this will be a total loss. No announcement has been made as to whether or not the company will re-build. There are two customs plants in the camp, and it is believed that other mills as well would be glad to obtain additional tonnage. It is understood that the mine shows three years demonstrated ore reserves.

Peterson Lake

Nothing further has developed regarding the proposed deal for the Peterson Lake, although the stock market seems to indicate that there was some definite basis for the rumors. The names of the Nipissing and O'Brien have both been mentioned as possible purchasers, but officials of both companies deny any interest.

Activities of Coniagas

The Coniagas has started underground work on the Ruby property. The diamond drilling campaign, in addition to giving some evidence regarding values, demonstrated a thickness of approximately 200 feet of slates and conglomerate. This company is also understood to be negotiating for the control of the Beaver. The latter property has been closed for the last two years, and has the deepest shaft in the camp, which was put down to 1,400 feet with the idea of exploring the lower diabase-Keewatin contact. At this depth a very strong and well-mineralized vein was found, and some development work was done on it at the 1,200 foot level. It was demonstrated, however, that the contact took a considerable roll and that this level was too far below the contact to obtain favorable results. The property was closed before further exploration work was undertaken, and has not since been re-opened.

Argonaut to Complete Mill

Officials of the Argonaut Mine in Larder Lake state that the company has sufficient finances to complete the mill construction, which requires an additional $50,000. Work on the mill was stopped for a time until it had been demonstrated that some of the richer ores encountered in the upper levels existed at the 500 foot level. To date approximately $750,000 has been spent on this property.

Boom in Gold Stocks

Porcupine is enjoying a running boom, and stock market quotations are rapidly discounting future developments. Results, however, at the leading mines have been exceptionally good, and new records for production continue to be set.

Dome's August Production

During August the Dome mill treated 35,000 tons and recovered $352,774, an average of $10.08 per ton. This is the best month of the year, and compares with $335,254 in July and $351,534 in June.

McIntyre Production Increases

The McIntyre mill extension is now in operation, and the output from that property is showing substantial increases. The annual report of the McIntyre for the year ending June 30th, shows that gold to the value of $1,937,105 was recovered from 193,971 tons of ore, an average of $9.99 a ton. Costs per ton were $6.12, but during the year a good deal of shaft sinking was accomplished at a total cost of $120,000, and this was charged against operating. The net profit was $552,716, which is $260,000 less than for the preceeding year. This is due, in part, to the expense for shaft sinking, charged against operating, and to a drop of $100,000 in non-operating revenue, which presumably represents exchange. Ore reserves are placed at 718,198 tons, averaging $10.37 per ton, an increase of over $1,000,000 as compared with that for the previous year. The report states that three new vein systems were discovered on the 1,375 foot level, which promise to be of great importance. The balance sheet shows an investment of $280,000 in the stock of the Blue Diamond Coal Company, and a further $290,000 loaned to the same company.

Water in Vipond Shaft

The sinking of the Vipond shaft to the 1,000 foot level was stopped at 900 feet on account of encountering an exceptionally heavy flow of water. Orders have been placed for heavier pumps and when these are installed sinking will be resumed.

1000-foot Shaft for Davidson

It is announced that the Davidson has been financed to the extent of $900,000, and that work will be resumed in the immediate future. The first work, to be undertaken will be the sinking of the shaft to the 1000-foot level. Mine reports show ore reserves of approximately $3,500,000.

Profitable Operation of Blue Diamond

The Blue Diamond Coal Company in Alberta is owned jointly by the McIntyre and Temiskaming Companies, and its report for the year ending June 30th shows net profits of $55,498, as compared with a deficit of $157,127 in the preceeding eighteen months. This company holds an option on the Canadian Coal Fields, Limited, at a purchase price of $1,000,000, payable any time before 1935. In the meantime, however, net profits from operations have to be paid on account of the purchase price. The business of the company is understood to be very satisfactory, and substantial profits are now being realized.

The Porcupine Mutual will do 5000 feet of diamond drilling.

BRITISH COLUMBIA

Developments in Portland Canal District

A. B. Trites, of the Trites-Wood Company, has bonded the Unicorn Group of Mineral Claims, Portland Canal District. He will proceed with development. He is one of those responsible for opening up the Premier Mine. At present he has men working on the Big Missouri Group in the same district. The new strike on the latter property is reported to be a quartz vein, samples from which give assay returns of around $800 per ton in gold.

The Fish Creek Mining Company, besides carrying on active development, is taking out ore by pack train, high grades being sacked and prepared for return trips as supplies are brought into the camp. Thus a valuable smelter shipment is being accumulated at Hyder. A good sleigh road will be available this winter over which it is proposed taking a compressor. This will permit the raising greater quantities of ore.

The Silverado Mining Co. Ltd., Vancouver, B.C., are actively putting their claims, situated on the east side of the mouth of Bear River, in shape for shipping. There are two camps, one at 3850 foot elevation and the other at 1700 foot elevation. These are terminals for a two-bucket tramway, nearly a mile long, which has been installed. A single cable tram, 1,000 feet long, connects the upper camp with the tunnel. The ore is lowered to the lower camp, thence rawhided to sea level. Ultimately a complete tramway from the mine to tidewater will be installed.

The Rutus Group, on the north side of upper Bear River, has been bonded by Gustave Seiffert, an operator of Stewart. An expenditure of $70,000 on development is planned. It is proposed to drive a 500 foot tunnel from which the entire mineralized zone will be crossed. A compressor is to be taken into the camp.

Stewart Welcomes Governor Bone

Citizens of the Canadian mining community of Stewart, B.C. had the pleasure recently of welcoming Scott C. Bone, Governor of Alberta, who was accompanied by Thomas M. Reed, judge of the first division, and Arthur Shomp, district attorney for the first division. They arrived on the U. S. revenue cutter, Unalga. They were re-

ceived by Dale L. Pitt, manager of the Premier Mine, Pat Daly, veteran mine operator, and other prominent Canadian residents.

Dolly Varden Operations Still in Abeyance

Alice Arm has received, with disappointment, the news that the Taylor Mining Company has been given six months to redeem its obligations to George Wingfield, the Colorado mining man. Miners interested in the district feel that this means that the Dolly Varden and the railway up the Kitsault Valley will remain idle until next year.

Lack of Water in Cariboo

J. D. Galloway, provincial mining engineer, has returned from a tour of the Cariboo District where he found hydraulic operations interfered with to some extent by lack of water. For that reason the gold output of that section will not be as large as has been expected.

Ottawa Mill Burned

The Ottawa Mill, Springer Creek, near Slocan City, has been almost totally destroyed by fire, the damage being estimated at $40,000. The plant had been shut down for one day for minor repairs and L. H. Biggar, one of the owners, was on watch when the outbreak occurred. Reconstruction, it is stated, will be undertaken without delay. Within recent months 11,000 tons of ore from the dump had been run through the Mill. Since December 1st last a production of $40,000 in silver has been made.

Promising Gold Veins in Bayonne District

Michael Sullivan, Spokane mining man, who has been inspecting properties of the Bayonne District, B.C., states that on the Bayonne Group a large tonnage has been uncovered along the main vein, which has been proved for 3,500 feet. Mr. Sullivan is interested in the gold claims of W. McCreath and associates in the Bayonne.

Copper in Portland Canal District

The development of large copper deposits on the Portland Canal, six miles from Stewart, B.C., is promised by Hugh B. McGuire, who has returned from eastern Canada and the United States where he has been interesting capitalists on the enterprise. Mr. McGuire states that no difficulty is experienced in securing money for the development of legitimate northern British Columbia mining projects.

Western Meeting, C. I. M. and M.

The annual western meeting of the Canadian Institute of Mining and Metallurgy will be held at Vancouver on November 15 and 16. There also will be a session at Nanaimo, B.C., on the 17th when the coal mines of Nanaimo, Ladysmith and Cassidy will be visited.

PORT ARTHUR NOTES

By J. J. O'CONNOR

A reorganization is taking place in the affairs of the Jackson Development Company, Ltd. of Port Arthur, Ontario. A new charter has been applied for under the name of the Jackson Gold Mines, Ltd. The Head Office will continue to remain at Port Arthur.

This company's property is located two and one-half miles east of Schreiber, Ontario, and adjoins the right-of-way of the Canadian Pacific Railway. It consists of eight mining claims in one group, aggregating 324 acres, lying along the strike of the mineralized zone for a distance of over three-quarters of a mile.

This area has been mapped by Mr. P. E. Hopkins, geologist, of the Ontario Department of Mines, Toronto, and has been found to be highly favourable for the occurence of gold in economic quantity. This conclusion is concurred in by many geologists, experience mining operations, and mining engineers who have visited and examined the geological structure of the Jackson area.

The Jackson is traversed by several narrow veins which outcrop on the side of Gold Range mountain. These veins, while narrow, carried extremely high values in gold. Late in the year 1920 Mr. Jackson sent a ton of ore from one of these veins to the School of Mines, at Kingston, Ontario, resulting in a return of $115.90 per ton. About 62 per cent was extracted as bullion and 24 per cent as concentrate, the balance being in the tailing. Both concentrate and tailing were found to be readily amenable to cyaniding.

This ore was extracted by means of a tunnel driven into the mountain. It was found that this tunnel on the series of veins did not give sufficient back to warrant further work at this point, and the management decided to sink a shaft on a mineralized outcropping in the low ground. On being stripped, this outcropping was found to be a fractured zone of over ten feet in thickness, carrying low values on the surface.

The shaft was commenced in June of this year, the work being done by hand. At a depth of 7 feet the ore averaged $3.51 per ton. At 12 feet a considerable amount visible gold came in, and continues to 16-ft., where the shaft is bottomed in an ore-body 5 feet in width, carrying good payable ore. Though the shaft is only 16 feet in depth, the management are confident they have discovered a commercially important ore body. It is planned to continue the shaft to the 100-ft. level before beginning lateral operations on the development of this fractured zone, and the cutting of the vein system on Gold Range hill at depth.

During the current year two tunnels, one of 59 feet and the other of 100 feet, were driven into the hillside to cut the veins, revealing ore that assayed from a few dollars to over one thousand dollars per ton on selected samples. These results were most encouraging, and the management believe that from what they have found at this point, it will be found that at depth the whole ground between the veins will be workable for a width of from 12 to 16 feet.

Advertisements other than "Employment Wanted" or "Employees Wanted" will be inserted in this department at the rate of 20 cents per agate line (14 agate lines make one inch). $2.80 per inch, each insertion, payable in advance. Space measured from rule to rule. When four or more consecutive insertions of the same advertisement are ordered a discount of 25 per cent. will be allowed.

Advertisements of "Wanted Employment" or "Wanted Employees" will be inserted at the rate of two cents a word, net. Cash must accompany order. If box number is used, enclose ten cents extra for postage in forwarding replies. Minimum charge 50 cents.

CHEMIST, experienced in blast-furnace work, ores, fluxes, etc., desires position. — Address Canadian Mining Journal, Box 516, Gardenvale, Que.

EDITORIAL

There is no question in my mind that we are on the eve of great achievements as regards the application of electric energy to the extraction of metals from their ores, and that the energy of the splendid, abundant, and as yet undeveloped water-powers of Canada will ere long be employed for metallurgical purposes.—Eugene Haanel — 1905.

AN IMPORTANT ELECTROCHEMICAL CENTRE

This week Canada welcomes as her guests in her chief city the members of the American Electrochemical Society. The gathering in Montreal is not an excursion to a foreign land; for the Society is virtually an international organization embracing all the electrochemical and electrometallurgical interests of the continent without regard to international boundary lines. As an exemplification of international comity between the adjacent countries, and the spirit of co-operation that pervades so much of our common endeavor, particularly within the sphere of scientific research, the organization and work of this Society is outstanding. We have here exemplified in the realm of practical science and (partly) of active business that oneness of aim, that mutual understanding and that common endeavour that characterise the co-operative efforts of the members of the British Empire. That the politically separate, and now the largest, member of the Anglo Saxon nations should be so ready for practical co-operation with us in such a way as this augurs well for a continued mutual understanding, and hence points the way toward the time when the world shall have the full benefit of the lofty Anglo-Saxon ideal, directed by the united moral force of all the Anglo-Saxon peoples.

It is entirely fitting that the American Electrochemical Society should choose Canada, and Montreal, as its annual place of meeting. We have in Canada more than our share of available hydro-electric energy, the principal basis of electrochemical manufacture, and close to Montreal is one of the principal, though one of the latest, electrochemical centres of the continent. Few Canadians realize as yet the present importance and the future promise of the valley of the St. Maurice River as a centre of chemical industry. Pulp and paper mills still consume the larger part of the power developed, but the metallurgical and chemical manufactories at Shawinigan Falls use a large part, and eventually will use much the larger part, of the power available. On the lower part of the river, within easy reach of Three Rivers, the St. Maurice is capable of furnishing one million horsepower at a cost less than almost any other water power of large size on the continent. It has been stated on good authority that the major part of, if not all, this million horsepower will be made available during the next few years. What this signifies in the development of the electrochemical industry of the locality, we can only suggest.

The principal electrochemical products at Shawinigan Falls are calcium carbide and aluminium. The establishments that make these two products, of growing importance in commerce, bid fair to become the most important of their sort in the world. Particularly is this the case of the carbide works, which provides the raw material for a synthetic chemical manufacture whose scope, though still undefined, fires the imagination with its possibilities. The original purpose of establishing the plant of the Canadian Electro Products was to provide acetone for the manufacture of cordite. Its war service in this respect was notable. Its subsequent peace-time activities have been no less notable. Synthetic acetic acid can now be produced there in quantities that will fill a very large part of the world's needs. Researches, carried on continuously since the inauguration of the process, have resulted in so improving and simplifying the methods that the manufacturing cost of Canadian synthetic acetic acid is now without compare in the world. As acetic acid is the raw material for numerous important chemical industries, the importance to Canada of a cheap supply in unlimited quantities need only be suggested.

While the chief raw materials for the manufacture of calcium carbide, limestone and electric power, are available to us within our borders in abundance, the bauxite from which aluminium is reduced must be imported. There seems only a remote possibility that bauxite will be found in eastern Canada. However, we have in abundance another mineral high in alumina, feldspar. If advances in metallurgical science should make possible the treatment of potash feldspar for the recovery of both the potash and the alumina it contains, then we shall have made possible a completely indigenous aluminium industry.

We have drawn attention in these columns on different occasions to the possibility of producing pure iron commercially by means of electrolysis. The success recently of the experimental production of electrolytic iron at Trail, British Columbia, by means of one of the several processes now available, suggests the possibility of

inaugurating such a process for the use of St. Maurice power. Important deposits of iron sulphide are available in the Eastern Townships, while the hinterland, still unexplored, offers opportunities for the discovery of other deposits.

The members of the American Electrochemical Society will visit the plants at Shawinigan Falls as a part of their Montreal meeting. There is no doubt that this excursion will not only result in stimulating the interest of many of those not already conversant with the scope of the electrochemical industries already in operation there, but will also be prolific of discussion that will provide many a good idea. It is such ideas, and the mental effort expended in adapting them to commercial use, that ultimately will result in making Canada pre-eminent for the wealth and variety of her electrochemical products.

PREVENTION OF FIRES

The Dominion Fire Commissioner has, by warrant of the Governor General-in-Council, proclaimed October 2nd, to 9th, as "Fire Prevention Week". Those interested plan to conduct a public campaign, especially among school children, with a view to educating all in the essentials of the seemingly simple precautions against fire. The annual loss in Canada is $45,000,000 in money, and over 350 human lives. We have seen no mention in the plans of the Fire Commissioner of miners—not that they do not need instruction and exhortation, we are sure.

The first structures at a Canadian mine are characteristically makeshift wooden affairs, with little attention paid to anything but matters of expediency. Often the first buildings are of logs, the head-frame of tree-trunks, and the pit timbers of logs on the hog-pen style. These are set in a tiny clearing, and are subject to all the dangers of a forest filled with prospectors, some of them careless and all of them subject to the accidents that sometimes result in forest fires. We shall remember long the disastrous experiences of 1911 in Northern Ontario; and the losses to British Columbia mines during the present season impress us once again with the necessity for adequate clearing and fire-breaks round a mine.

As transportation becomes improved and a saw-mill is brought in, the community centred round the shaft assumes the semi-civilized appearance accorded by rough sawed lumber and clap-boards. Stumps, and even standing timber, are interspersed among the buildings. The sunlight has been let in sufficiently to make tinder of every thing from the moss upwards. This stage of development presents his best opportunity to the fire fiend, and preventive measures adequate to the need have seldom been taken.

As the little community becomes better ordered, the fire risk usually is lessened by more thorough clearing of the ground and more thorough building construction. But all too much of the temporary fire-trap construction that was necessarily characteristic of the building before the value of the mine was proved, is fairly sure to survive this uncertainty. Hence conflagrations in a mining community are looked upon as a variety of necessary evil,—the accepted, through drastic, preliminary to a thorough straightening-away and cleaning-up.

We would judge that the miner needs, more than the average citizen, education in fire prevention. From his circumstances he is necessarily more exposed to fire risk. Let us, then, take note of Fire Prevention Week, and do our bit to see that that good servant, fire, is kept strictly in his place.

A SUGGESTED USE FOR FELDSPAR

A few weeks ago we suggested, in these columns, that our abundant supplies of potash feldspar might be made useful by means of a process for the manufacture of ferro-silicon, reputed to be in successful operation in Sweden. In this process the potash becomes available for fertilizer by grinding the slag. The alumina is lost.

We wish now to make a further suggestion—a suggestion not backed by any experimental work, and therefore certainly of less value than the former one, though it may possibly hit the mark and so stimulate some determinative experimental work. Why not recover the alumina from such a slag, instead of putting it on the fields, where there is already sufficient clay?

The chief difficulty in using feldspar as a source of potash is the 65 per cent. of silica present with the 15 to 18 per cent. of alumina and the 12 per cent. of potash. If the silica were removed, as suggested, the slag would consist principally of alumina and potash. It might well be that the separation of these two ingredients and the necessary purification of the alumina for the manufacture of aluminium could be effected as economically as the present treatment of bauxite. Here is the suggestion, for what it may be worth!

A GRATIFYING RESPONSE THUS FAR

It is satisfactory to learn that returns received to date by the Department of Finance indicate a very general acceptance of the Minister's offer to convert 1922 Victory Bonds, maturing the 1st December next, into new bonds bearing 5½ per cent. interest and running for a further period of five or ten years as desired. In fact, many holders of these 1922 Victory Bonds would like to take up considerably more of the new bonds than they hold of the maturing issue. This, however, is not permitted, as cash subscriptions are not being invited at this time. But it may be pointed out that it is, of course, open for such persons to add to their holdings of 1922 bonds by purchasing them in the market, or from other holders who require the cash, and then to surrender them for new bonds. As a fact, it is known that this course is being followed.

The present holders of the 1922 issue have until the 30th instant to decide their course of action. But it would be well for those who wish to avail themselves of the offer of the Minister of Finance to surrender their bonds

at once rather than to delay doing so until nearly the last moment. For the 1922 maturity, when it was issued in 1917, proved a prime favorite with small investors, many of whom were buying bonds for the first time. In consequence of this fact, there are very many thousands of individual holders of these bonds. Hence it would not only be a great help to the bonds and to the Department of Finance, in carrying through the conversion expeditiously, but also a great convenience to the holders themselves, if they would turn their bonds into the banks as speedily as possible. As it is, there are now only eight days remaining in which to do so.

As we said, just now, this 1922 maturity, when it was issued in 1917, was a prime favorite with small investors. It was of the utmost importance to the country and to the country's *morale* that, in the grim days of war, the high patriotic fervor, which literally swept the Dominion, from the Atlantic to the Pacific, should have resulted in hundreds of thousands of Canadians becoming, for the first time, investors in these Dominion securities. And just as it was of the utmost importance to Canada that these hundreds of thousands of small investors should have subscribed in the first instance, so it is profoundly desirable now — and desirable from a national, not less than from the individual, viewpoint—that their investment should be continued in the way that the Government's conversion offer admits. On all grounds, it would be little short of lamentable if any considerable number of the holders of these maturing bonds should pass over the Minister's offer, with the idea of using the money at maturity either for less sound investments—when there is no sounder security in the world today than that offered by the Dominion Government—or for unnecessary expenditures—at this time when economy is the plain duty of us all, alike as a nation and as individuals.

EDITORIAL NOTES

The preliminary signal to a possible call to arms discloses throughout our Dominion an enthusiasm well tempered by experience. If enlistment should become necessary, there is absolutely no question of the response that will be made. We sincerely hope it will be unnecessary. Meantime it is disturbing, as well as rather humiliating, to have our chief executive at Ottawa reported, principally by means of his own words, as doing the usual skilful feat of balancing on the fence. Surely we Canadians are worthy of a less equivocal representation than this in what may prove to be a moment of crisis.

Mr. Charles Camsell, Deputy Minister of Mines at Ottawa, has made himself actively interested in Canada's "prosaic minerals". His trip to the Old Country was primarily to receive the Murchison Award of the Royal Geographical Society and to attend the International Geological Congress in Brussels as one of Canada's delegates. His efforts on behalf of our minor minerals have had wide-spread publicity in Canada, and we hope the same is true of Britain. Now comes an opportunity for taking a further step in the right direction. It is announced that the Canadian Chamber of Commerce in London has decided to organize a section at the British Industries Fair, to be held at Birmingham next March. This may provide a first-rate chance for making British manufacturers acquainted with Canadian mineral products.

Mr. Kipling, if he has been correctly reported by the newspapers, reminds one of that most fearsome of all nuisances, the man who conducts a postmortem over a game of cards. There are many live issues to which the brilliant poet could more decorously divert his energies. Scolding the United States about the part is played in the war is not sporting. We should like to have the author of so much that has given us joy write a ballad on the fuel situation, or on mine labour, or on any of a dozen live topics. Mr. Kipling needs exercise.

That we are as yet but skirting the edge of the science of the proper use of coal is not to be denied. The leaders of British and Continental research admit frankly that they are only on the threshold of a right comprehension of the composition of coal. The anomaly here is that the carbonization of coal has been a commercial process for at least 150 years.

Startling as are the press announcements concerning the claims of the new Elmore Process, there is reason to believe, or to hope, that they are well founded. At Broken Hill, New South Wales, the Zinc Corporation is installing a 25-ton unit. It is stated that, at low cost, the Elmore plant will turn out pure metallic silver and lead and a clean, residual, zinc concentrate, the recovery in each case being over 95 per cent. of the original metal content of the ore. Whilst this sounds too good to be true, yet the undertaking is sponsored by responsible technical and business men.

CIRCUMLOCUTION

He brought me a specimen lousy with gold,
And he said that it came from a *locus*
Where the shores of Lake Larder are frowning and bold
Oh! he vowed there was no hocus pocus

He gave me that specimen lousy with gold;
And I gave him a cheque to his order,
But something went wrong and I knew I was sold,
For he lit out that night for the border

I still have that specimen lousy with gold;
But I now have a very firm notion
(A notion on which you can't loosen my hold)
That it came from a mine Nova Scotian!

ANON

Exploiting The Prospector

(Written specially for the "Canadian Mining Journal")

In former articles the prospector's work was traced up to the point where he had a property to dispose of in part or in its entirety. This stage of the game, which is ever beset with guns and snares and pitfalls, deserves separate treatment. It is the stage at which the prospector, as a vendor, is most shockingly prone to errors of judgment. On the one hand, he may sacrifice his perfectly good bone for an illusory and unsubstantial shadow, (the ducking that the dog got is never mentioned), and on the other hand he may do too much watchful waiting at precisely the time when action is most needed.

Now to my mind the three positive dangers that threaten the prospector who is trying to dispose of a property, are the broker, the willing intermediary, and the unattached promoter. Of these three, each is less to be desired than the other two if you happen to be doing business with him.

The Broker

In my day I have met a genteel sufficiency of brokers—mining brokers. From the very nature of their calling it is not praticable to classify them as "good" or "bad". They may be pleasant or unpleasant. But no one who knows them would dream of measuring them by moral standards. In a sense, a colloquial sense, they are ethical, because they will play each other's game, but always at your expense.

All mining brokers seem to have been sophisticated at birth. Their air of sophistication is greatly enhanced by the use of large, horn-rimmed spectacles. All of them have certain set formulae whereby they can put your property on the market, and, in effect, put you out of the property.

An instance from real life: A few years ago, not very many, a prospector arranged that a Toronto (or Montreal) mining broker should handle his property for him. The broker agreed to do it on condition that he, the broker, should have the entire "say" as to capitalization, marketing of shares, etc. The broker organized a company. He named it the "Johnny Smith", which, for illustration's sake, we will take as the prospector's name. I may say here that the prospector's real name was widely known and that he was deservedly liked and respected.

The company was capitalized at $3,000,000, of which $1,000,000, represented by shares, remained in the treasury. A terrific advertizing campaign, exploiting the "Johnny Smith" mine (which was not a mine) was inaugurated. At first, I think, Johnny Smith was rather tickled with the publicity, but not for long. He was a simple, but really honest, soul. A flashy prospectus was issued, full of standardized dope about the fortunes made in Treadwell, Homestake, and Hollinger. Then the time came when Johnny wanted money for himself and for work on the property. None was forthcoming. Without going into painful details, the net result was that Johnny found that he owned only one-fifth of the issued shares, that there was no money in the treasury, and that only the broker's own shares had been sold.

Out of about $65,000 raised, $18,500 had been spent in advertizing, $2,500 on the prospectus and circulars, and $2,000 on "organizing expenses." The balance went into the broker's pocket. The property was never developed. There remains to-day, a melancholy monument, the small head-frame of the shaft, visible near a Northern Ontario railway siding.

This may be an extreme instance. Yet it is typical enough of the broker's tendency to exploit.

It is my deliberate opinion that the broker serves a useful purpose only when he handles shares on a commission basis. As an organizer and promoter his services are too costly for any small enterprise to have a chance of life.

The Intermediary

In the lobby of any large hotel the questing prospector can find any number of men willing and anxious to introduce him to someone through whom he will meet some one else, who is "in touch" with some person possessing capital. This leads to a sad and confusing succession of "touches", and is a fruitful source of lawsuits for commission. Some of these suits are excusable, some are unadulterated blackmail.

The only advice that is worth giving here is "don't". Don't do business in a hotel lobby. Hotel lobbies are the general offices of the parasitic hanger-on, some of them well-meaning enough, but all of them incapable of doing anything that the prospector cannot do better for himself. Their very willingness and eagerness to take up a proposition is *prima facie* evidence of their lack of responsibility.

The Unattached Promoter

Of this person it is not easy to give a fair description. He is a chameleon. He assumes a myriad form. But he, like the intermediary, is found mostly in hotels. Rarely has he a fixed abode, a local habitation and a name. The decimal point for him is removed far to the right. He has numberless moneyed friends and associates. He specializes in long telegrams, costly long-distance telephone calls, good clothes, protestations of integrity, and is strong on documents. He will probably explain to you how much his drafting of certain legal documents has been admired by prominent lawyers. He has ready money and he spends it. But who the men behind him are, you never learn. If you get any money at all out of him, you or somebody else pays a very full price for it.

I need not elaborate. Leave him alone. He is not for you.

* * *

To sum it all up, any self-respecting prospector is well-advised to eschew all three of the superfluities mentioned above, and to go direct to some active mining investor, preferably one identified with a large mining company, who will drive a hard bargain, but whose cheque is handled with reverence by the cold-blooded banker who, after all, is the channel of your happiness and of mine.

CAPRICORN.

A CORRECTION

On page 609 of the issue of September 8th, under the caption "Mines and Quarries of Canada", it was inadvertently stated that the lists had been issued recently. This is decidedly in error, as these lists were issued during the latter half of last year. No lists more recent than these are at present available.

The topographic Survey, Ottawa, has in progress a survey of Great Slave Lake, which is larger than Lake Ontario, and is dotted with islands that have never yet been mapped, many of them having been discovered only during the course of the survey. On one of the islands, Caribou island, gold claims have been staked recently. There has been gold reported also on the north shore, in the vicinity of Yellowknife River.

The Mount Mulligan Colliery Explosion In Queensland

By JAMES ASHWORTH

Although this explosion only occurred on the 19th of September 1921, the Mines Department of the Government took up the matter of enquiry with such energy that by the 23rd day of the same month a Commission consisting of R. A. Dunlap Esq. Police Magistrate and Warden, the Hon. Charles Fitzpatrick, M. L. C. President and Inspector for Queensland Coal Mines, and William Want Esq., Manager of the Queens Collieries, Bundamba, was appointed to make a full enquiry and report. The Commission began work on the evening of the same day.

Mr. Dunlop was already at the mine, and on being joined by the other members commenced personal inspection of the mine on the 29th of September; by the 25th of November, they handed in their report, accompanied with the notes of evidence in extenso, exhibits, plans, photographs, and suggestions, to render the mines safer during their future working.

The Commissioners found, "after making a minute examination of the mine workings, and considering the oral and written evidence of all available witnesses,":

(1) That an explosion of coal dust originated at the face of No. 11 gateway, Fitzpatrick's machine wall, south side of No. 2 seam, and travelled the working faces and roads of the mine and passed out of the entrance of both intake and return tunnels.

The Cause of the Ignition

(2) Three possible sources of origination have been suggested by the evidence.

First, the discovery of the top half of an acetylene hand lamp which was made in two sections, the bottom being made to clamp to the top, created an inference that the contents had exploded in the lamp and ignited the coal dust. An examination of the parts found showed no damage. The thin rubber washer between the two parts was adhering to the top part of the lamp, and had not been scorched. In view of the fact that more tangible evidence of other sources of ignition is available in this place, and that this theory was set up tentatively, we have discarded it.

Second, the theory set up by Mr. J. T. Watson (the colliery company's superintending engineer) supported by Mr. James Harris, engineer, that the charge had been exploded in contact with an open light in Morgan's hand when he was in the act of carrying it to charge a hole, is discussed at length under the heading of "Consideration of Evidence."

As the weight of evidence is against this theory, and the evidence advanced in its support conflicts with other evidence, and takes no account of certain singular results observed in that place by witnesses, we find that this theory is untenable.

Having considered from every point of view the several theories advanced, including the possibility of an ignition of methane or other inflammable gas, having made minute examinations of mine workings, and carefully investigated the depositions of witnesses, we are unanimously agreed

Third, the cause of ignition was the firing of an explosive, either accidentally or otherwise, on the top of a large block of fallen machine cut coal, such explosive not having been placed in a shot hole.

It is difficult to understand how explosives, being used in the ordinary way, could be fired at this spot. Alternately the conclusion that obtrudes itself is that a plaster shot was placed on this block of coal to break it so as to facilitate handling, and it exploded prematurely, either because of defect in the fuse or from some other cause, such as a fall of roof stone.

Propagation

Explosion effects were not immediately violent, propagation proceeding with various degrees of velocity and intensity throughout the mine.

Explosives were distributed, carried, used, and stored underground in a careless manner, without regard to the regulations.

Condition of the Mine

The mine was dusty and extremely dry, and no adequate means were adopted to render dust innocuous, as prescribed by regulation.

The Commissioners conclude their report with eleven Recommendations which include an Act for collieries separate and distinct from the Mines Regulation Act for 1910—Inspectors, Record Books, Explosives, Safety lamps, Stone Dusting, Special Rules, Rescue Stations, Reversal of Air Current, Shot Firing and Experimental Station.

The evidence showed quite clearly that the observers outside saw the display of distinct forces from the explosion, the first being from the fan tunnel and the second one from the main tunnel, with an interval of about one second. The noise was heard at least 15 miles away. The fan was destroyed and rendered useless, and at the main tunnel the jig drums and a blacksmith's shop were carried away and grass set on fire for a considerable distance. As the explosion produced two separate reports outside, it gave rise to the impression that there were two points of initiation and a great deal of evidence was given with that supposition in view. Eventually, however, the Commissioners decided that the "focus" of the explosion was on Fitzpatrick's longwall face, where there was a Sullivan Bar coal cutter. It was evident, however, that the explosion had not originated at the coal cutter, as the machine had not been at work that morning. In another stall on the outbye side of the coal cutter, some of the explorers noticed a large piece of fallen coal, but it does not appear to have attracted any particular notice until Mr. Want, one of the Commissioners took note of its surroundings. It was observed that a large piece of machine cut coal along with a band of fireclay had fallen so as to almost block the stall on its right hand side, that in the roof behind the coal there was the bottom part of an unfired shot hole, that the miner's tools were all close to the miner's body, and that the wooden tamping bar was close to his body, which was found in a sitting position at the end of the skip. This skip had been thrown off the rails, supposedly by the force of the miner's body striking it. The skip was half full of hand loaded coal, and the skin of the man's back remained attached to the skip when the body was removed. The men all worked without shirts. The evidence of force at this gate end

showed that it went outwards down the gateroad and also both inbye and outbye along the coal face. The focus of the explosion was at first assumed to be the Sullivan coal cutter, which was in the next gate road inbye, but as part of it, weighing upwards of one cwt, was also carried in the same direction, and the trailing cable, etc. were jammed underneath the coal-cutter. it was demonstrated that the theory of the origin of the explosion in No. 11 stall was strengthened. However, the witnesses were not agreed as to the origin of the flame or of the explosion which originated the disaster. The Commissioners seemed to think that it had originated from a charge of explosive placed on the top of the block of coal because in one place there was a slight depression on the top of it, with some comminuted coal also around. This reckless mode of blasting was called "plastering," or as named in other places "bull dosing". This would have been considered reckless at any other coal mine, but it was no more reckless than the general treatment of explosives inside this mine; in fact, the working places were actually found strewed over with cartridges and detonators after the explosion; some of the cartridges were found charred outside and some had coked dust on them. However, the plastering argument could not be supported by the surrounding conditions, and thus it was one point which was not decided by the Commissioners and is open for a more practical theory. Other factors need to be taken into account; for instance, the miner Morgan had just completed drilling a hole to shoot down the coal, and had his wooden tamping bar and presumably his explosives also at hand. Apparently unknown to the miner, there was a slip in the coal seam parallel to the face, which eventually caused the coal to fall without shooting. Probably the miner heard the coal cracking and stepped back with the tamping bar still in his hand. Meanwhile the falling coal raised the dust from the floor and carried it in the ventilating air current inbye into No. 12 gateroad, whilst the mass of falling coal on its impact with the floor naturally detonated the explosive charge with which the miner was preparing to charge the shot hole. In confirmation of this it is very noticeable that the remains of Morgan's store of explosives were found in this stall gateroad, viz., 50 detonators in an open tin with only 1½ plugs of monobel and a coil of fuse. In further confirmation of this supposition the miner had had no time to move any of his tools, and his body was blown backwards by the force of the resulting explosion, against the end of the partly loaded skip, thus throwing it off the rails and leaving his body in the position in which it was found. This supposition is again further confirmed by the very great force exerted, which although it only crossed one stall was sufficient to lift the loose cover of the coal cutter and carry it (one cwt.), no less than 30 yards inbye. The miner's mate was found 142 feet down the gate road, and there was a deposit of coke on the inbye side of the props in the gate road. The fall of coal was about 5 yards in length, with the machine cuttings as well as the trailing cable underneath. In the next stall, No. 12, one hundred detonators and a packet of monobel were found laying near the rails. The "slip" in No. 10 was well defined and extended from roof to floor. There was slight evidence of coking both inside and outside the partly loaded skip in No. 11. The evidence in No. 10 stall showed that the blast came from No. 11, and a full skip of coal was thrown off the roadway. The Commissioners when making their first inspection found in No. 7 stall one plug of Australian made gelignite, 25 plugs of monobel, and one coil of fuse, lying beside the road without a container. The monobel showed distinct evidences of coking. Three plugs of monobel were found outbye, the lid of the box being open and paper scorched. The blast was traced down the wheeling road on to No. 11 level and most of the distance outbye. Loose explosives were found in all parts of the mine, where at work, but no secondary explosion was found to have occurred, due to the careless abuse of the storage and use of the explosives, detonators and fuse.

It was thought that there had been two distinct explosions, with about one second's interval between, but the examinations of the mines did not confirm this; in fact, when the evidence is carefully sifted it is evident that the "contrary" effects were due to the fact that the return air way provided the shortest distance for the expansion of the heated gases from the point of origin; hence the first outside evidence of the explosion was seen at the fan, which was blown away and destroyed, whilst the force which travelled outbye and came to the open air through the main tunnel had the longest distance to travel, but had the best supply of coal dust to carry it along. Thus there were "contrary" effects clearly demonstrated at the junction of both No. 11 and No. 12 south levels and the Middle Slit with the main slope.

Humidity

It would appear that this feature of what we might call "Safety" precautions received some respect; thus the mine was provided with a hygrometer, and it was used at times, with the net result that the mine was considered "dry" and dusty. The results of any examinations were reported in percentage of humidity. Thus, every time that the dry-bulb thermometer showed either an increase or a decrease in heat, the scale of actual dampness was altered and there was no basis of comparison. One would naturally assume that as most people used to regard and many de so still a wet or saturated condition of the atmosphere of the mine as a point of excellence to aim at; but taking the the figures from Mr. Watson's evidence as the superintending engineer at Mt. Mulligan, the dry bulb ranged from 80 to 84 degrees, and the wet bulb from 66 to 70 degrees thes, if both bulbs registered 84 degrees of saturation, it was evident that each cubic foot of air was carrying 12.4 grains of water vapour, and if both bulbs registered 76 degrees, then we again had saturation but with a reduction in the weight of water vapour carried, viz, 9.7 grains or a difference of 2.7 grains per cubic foot. The next question is naturally what is the object to be attained: Is it the health of the of the miners and their comfort whilst at work, or is it the imaginary safety of the mine against explosions? To answer the last query first, it is absolutely useless for the latter purpose and more than useless, as even more moisture is required to give the high explosive effects; in fact, at least thirty per cent. is necessary to exert any restraining effect. It is therefore made plain that for restrictive or safety purposes water is practically useless.

Now, as to the health of the miner, which ought to be the first consideration. If he must have a cool ventilating air current to work in, how is this to be accomplished? The cure is quite simple: you must make the current as *DRY* as possible and with a velocity which will not stir up the dust too much. Then the air not being saturated with moisture will carry off the perspira-

tion from a man's skin, and the velocity gives him a feeling of coolness and he might work with his shirt on his back even in Mount Mulligan coal mine.

Just as a matter of comparison and if possible to exemplify the ridiculous use made of humidity tests, we can refer to the 1921 Annual report of the Minister of Mines for British Columbia. There will be found the readings of the hygrometer in the most gassy mines in the world and where watering is considered a "Safety" provision: the quotations are given in percentages of humidity. Thus at 52 degrees in the return air the weight of vapour carried is 4.4 grains only, and this is 100 per cent. humidity saturation for 52 degrees. In the same table is a case where the heats are 67-66 and the vapour carried is 6.8 grains for 93 per cent. humidity. Which then is the safest atmosphere: the one with the highest percentage of humidity or the one with a lower percentage of humidity but a greater weight of water vapour?

Safety first is a universal cry all over the world, especially in connection with coal mines, and with such carefully prepared reports as the one made on Mount Mullingan to stir up a willing Government a vast increase in safety may and will undoubtedly result.

The Commissioners devoted a section of their report to a "Review Leading to Recommendations," and subdivided this again under the heads of (1) Explosion Effects, (2) Department Inspections, (3) Prevention, (4) Dust Treatment, (5) Proposed Reduction of Oxygen, (6) Explosives, and Shotfiring (7) Lights, (8) Experimental Station, (9) Rescue Work.

The very first paragraph under the heading of Explosion Effects needs some further explanation. The Commissioners say "the dust in the whole of the return air was raised by concussion and subsequently detonated by the flame or explosion wave". This would seem to imply that the speed of the effect which raised up a universal dust cloud was only that of the sound wave, viz., about 1100 feet per second, which appears to be far too slow to precede the explosion wave, which the Commissioners say was subsequently "detonated". This is a most important statement, as so far as the writer knows no scientist has yet described how it is possible to detonate a mixture of coal dust and air, nor yet what is the meaning of the word detonation when used in connection with colliery explosions. Thus, if we assume that detonation took place at the point of origin, in No. 11 stall, at Mount Mulligan, then we should have to conclude that it was consummated when the detonator and charge of monobel was fired by the lump of coal, in which case it would mean instantaneous death to the whole of the men in the mine. Some of the men were, however, assumed to have moved during the development of the explosion, and this would therefore suggest that the explosion was a violent inflammation of the mixture of coal dust and air, and no admixture whatever of methane. It is quite true, as stated by the late John Gerard of H. M's Inspectorate staff, in England, that very few people appreciate how very small a proportion of coal dust makes an explosive atmosphere, although some authorities insist that a pioneering cloud is necessary.

The most modern research by physicists has introduced the Electron theory and the ionization of gases as factors which may have to be taken into account when considering the safeguards necessary in dusty coal-mines, especially that part of the subject which has to raise a "cloud" or a "pioneering" dust in front of a flame which may be travelling at a speed of from say 3,000 to 5,000 feet per second. The Commissioners very strongly and very properly recommend the establishment of an experimental station and there is no greater or more important research which can be undertaken than that connected with the safeguarding a coal mine from coal-dust dangers. A coal-dust explosion in a torrid zone seems possible, but why should a coal mine (Longyear, Spitzbergen) be equally dangerous when exposed to similar conditions although frozen stiff both inside and outside?

THE MINERAL PRODUCTION OF CANADA

During the six months ending June 30, 1922

According to a survey made by the Dominion Bureau of Statistics the total estimated value of the mineral production during the first six months of 1922 was $57,682,944 in which $26,475,544 represented the value of the metal production and $31,207,400 the nonmetals. As compared with the same period in 1921 the value of the metals is seen to have increased about two million dollars or 9.1 per cent.

The standing of the different provinces in the Dominion according to the returns for the half-year was as follows: Ontario, $18,833,577; British Columbia, $16,153,307; Alberta $10,062,318; Nova Scotia, $8,792,-799; Quebec, $2,051,455; Yukon, $714,652; New Brunswick, $590,456; Saskatchewan, $266,041; Manitoba, $215,339.

The ten principal products of the mineral industry in Canada during the period in order of the values assigned where, coal, $24,346,959; gold; $12,110,242; silver, $5,997,199; lead, $2,882,047; natural gas, $2,-418,829; copper, $2,337,093; asbestos, $1,894,232; nickel $1,401,820; zinc $1,370,460; and salt, $849,133.

Excluding the value of natural gas, the total value of the production of these commodities during the period was $52,340,052, as against $59,615,309 during the first six months of 1921. The decrease amounted to 12.2 per cent. and was due largely to the slackness in shipments of coal and the weakness of the nickel and copper production.

The outstanding feature of the metal production was the excellent gains made in the output of gold by the two important producing provinces, Ontario and British Columbia. The total for Canada during the period amounted to about 63 per cent. of the whole 1921 production, an increase of 12 per cent. over the production during the six months of that year. The increased prices and the lively markets for silver and lead were reflected in excellent gains in production over the half year of 1921. The zinc production remained about the same, cobalt increased slightly, while copper and nickel, as might have been expected, fell off considerably.

The pegmatites are essentially coarsely crystalline rocks. Under some circumstances the dimensions of the crystals may be enormous. In the Ural Mountains a quarry was opened in a single orthoclase crystal, in India muscovite plates 10 feet in diameter have been found; at the Etta Mine, in the Black Hills of South Dakota, spodumene occurs in crystals resembling tree trunks and as much as 42 feet in length.—[illegible] Mineral Deposits.

Report on Bridge River Area, British Columbia

MOST PROMISING PART OF THE LILLOOET DISTRICT

There has now been issued by the Geological Survey, Ottawa, W. S. McCann's Memoir 130, *Geology and Mineral Deposits of the Bridge River Map-Area, British Columbia*. This report of 100 pages describes the geology and minerals of an area 25 miles square, the south-eastern corner of which touches Marne station on the Pacific Great Eastern Railway. The Bridge River, and a wagon road along it, cross the centre of the area and both extend 20 miles farther eastward to Lillooet, on the railway.

Rocks of the Area

The rocks of this map-area are similar to those of some other areas recently described in these columns. Sedimentary rocks of Carboniferous age, interbedded with volcanic flows, were folded into mountain ridges, and then deeply eroded (Bridge River Series). In early Mesozoic times there were small intrusions of olivine rocks, and then a subsidence of the land surface, followed by the deposition, under water, of a series of sedimentary rocks and volcanic flows (Cadwallader series). Later in the Mesozoic era (Jurassic period) there came the vast intrusions that formed the Coast Batholith and that brought such a widespread distribution of mineral deposits throughout western British Columbia. Since this intrusion there have been other series of sedimentary rocks laid down and other intrusions of igneous rock, which have provided no minerals of economic importance up to the present.

Minerals of the Area

Of the area in general, Dr. McCann says: "The Bridge River map-area owes its present status as the most important district in the Lillooet mining division to the gold-quartz veins contained in the augite-diorite stock near Cadwallader creek. The silver-copper of McGillivray mountain, the antimony deposits and the gold placers are of minor importance.

"The mining properties of the district are still in the prospect stage of development with the exception of a few of the properties on Cadwallader creek. The difficulties of transportation, combined with the lack of capital required for exploitation, have accounted for the slow development of the region. Moreover the district has never been affected by a boom which would serve to attract outside interest.

"... Considerable tracts of promising territory still remain unprospected for gold, and certain belts, as indicated on the geological map, might advantageously be searched for platinum, diamonds, cinnabar, antimony, and possibly some of the higher priced non-metalliferous deposits such as magnesite, talc and asbestos."

Possibilities of the Gold Properties

The only properties of the district that have produced values are a few of the gold deposits along Cadwallader Creek, namely, the Coronation, Lorne, Pioneer and Wayside mines, in which a considerable amount of work has been done. All other of the numerous deposits discovered are in the prospect stage of development. The extreme difficulties of transportation, even since the Pacific Great Eastern Railway was pushed through to Lillooet, have militated against an active and thorough development. In spite of this, $350,000 in gold has been won from the ore, principally by means of treatment in the primitive arrastra. As this ancient metallurgical device, and even the stamp mills installed subsequently, can recover gold only when it is "free", and as a large part of the gold in the ore is securely locked up in arsenopyrite, only a fraction of the gold available has been recovered. This report suggests that, with the aid of the present improved transportation facilities and modern metallurgical treatment, the camp might develop into a consistent and important producer of gold. It is also suggested that an amalgamation of the various small properties would be conducive to economy of operation and would stimulate a rapid and consistent development.

Producing Properties

The gold deposits of Cadwallader creek are, in the main, of one sort. They occur in well-defined veins, mainly of quartz, filling fault fissures of irregular width in the augite-diorite intrusive rocks. They have characteristically a ribboned structure where the values are best. The gold occurs mainly in irregular shoots, and usually in wide parts of the veins, in association with sulphides, arsenopyrite and tellurides. Values are erratic, and there has not been sufficient development work done to study effectively the trend of values. The wall-rock does not contain workable values, so far as determined.

The Lorne deposits were located between 1897 and 1899, and arrastras and, later, a five-stamp mill, have produced $100,000 from its ore. The veins are narrow, and pay ore is in shoots. It is said that the ore treated has yielded about $17 per ton, this representing a 60 per cent. recovery.

The McGillivray mine, equipped with a 10-stamp mill, has produced $35,000 in gold, the yield per ton on the plates being $25. The main vein has been developed for a length of 600 feet, and is of unusual width—up to 20 feet. The average values are low. No work has been done on the property since 1910.

The Pioneer mine is equipped with a five-foot Chilian mill and concentrating tables. The veins are narrow, averaging two feet, and the ore is said to average $13.50 per ton. Some ore-shoots have yielded $60.00 per ton by amalgamation.

To gauge the value of these gold deposits, Dr. McCann examined the gold mines of Grass Valley, California, which are similar to those of Bridge River and have been operated successfully. That he is optimistic as to the possibilities of successful mining at Bridge River speaks well for its future as a gold producer.

Other Minerals

Silver-copper ore has been developed at the Wayside mine, but the values so far determined are not promising.

Antimony ore has been found in various places, notably on the Stibnite claims. The deposits so far located are not of economic importance.

Associated with the serpentine rocks are found chromite, minute diamonds, magnesite and asbestos. These have been so little investigated that their value is still undetermined.

As regards further development, Dr. McCann gives this sound advice: "The Coast mountains and the Interior "plateau of British Columbia afford a promising field for "systematic prospecting and mine development. But many "difficulties will have to be overcome, close attention will "have to be paid to the structure and origin of the de-"posits, and operating companies will do well to employ "mining engineers who have gained experience in the "opening up of similar deposits elsewhere."

Mineral Production of Ontario

FIRST SIX MONTHS OF 1922

Returns received by the Ontario Department of Mines from the metalliferous mines, smelters and refining works of the Province for the six months ending June 30th, 1922, are tabulated below. For purposes of comparison the quantities and value are given for the corresponding period in 1921. Tons throughout are net tons of 2,000 pounds.

Summary of Metalliferous Production
—First Half of 1922

Product		Quantity (6 mos.)		Value $ (6 mos.)	
METALLIC		1922	1921	1922	1921
Gold	ounces	476,338	286,018	9,845,910	5,761,504
Silver	ounces	4,774,666	1,277,762	3,273,247	2,552,125
Platinum metals	ounces	151	941	9,421	26,317
Copper sulphate	lbs.	22,553	87,382	1,310	3,495
Copper metallic	lbs.	495,899	2,297,732	57,603	272,132
Copper in matte exported (*)	tons	505	314	101,000	55,040
Nickel in matte exported (*)	tons	425	811	212,500	407,000
Iron ore (**)	tons	1,004	22	14,472	99
Iron, pig (**)	tons	10,517	27,117	258,953	733,568
Iron Arsenate	lbs.	75,000	.....	938	.....
Cobalt, metallic	lbs.	2,111	30,423	7,246	91,355
Cobalt oxide	lbs.	153,510	99,533	315,284	201,853
Nickle oxide	lbs.	137,258	331,078	75,002	65,652
Nickel Cobalt oxides, [unseparated]	lbs.	(¢) 647,254	26,592	(¢) 131,525	29,720
Nickel, metallic	lbs.	102,200	3,121,773	29,466	1,071,479
Other Nickel compounds	lbs.	27,270	111,279	2,231	9,991
Lead, pig	lbs.	1,993,880	1,504,830	112,604	79,322
TOTAL		.....	.....	11,418,312	11,363,652

* Copper in matte was valued at 8 cents per pound in 1921 and 10 cents in 1922, while nickel in matte was valued at 25 cents per pound for both years.

** Iron ore figures include only exported product or ore shipped to point other than Ontario blast furnaces.

Total output of pig iron was 178,863 tons worth $4,463,547.

Figures in the table represent proportional extracted value of product from Ontario ore.

¢ Includes residues marketed.

Gold

Gold production for the first half of 1922 shows a marked increase over any similar period and gives promise of an output exceeding $20,000,000 for the full year as compared with $11,621,085 in 1921.

Porcupine, Kirkland Lake and newer gold areas are attracting the attention of the mining and investing public not only in Canada but throughout America and Great Britain. The Hollinger Consolidated has established its reputation as one of the greatest gold mines of the world.

At present the milling capacity is 4300 tons daily. When additional hydro-electric power is available the ore treated will be increased from 4300 to 7000 tons daily. The McIntyre mine has increased its milling capacity 500 tons per day beginning this month, and is sinking the central shaft to a depth of 2500 feet. The Dome shaft has been stopped temporarily at a depth of 1,634 feet and a crusher station is being placed on the 12th level (1150 feet). Producing mines at Porcupine and Kirkland Lake have a combined daily milling capacity at present of 7,000 tons approximately.

For 1921 the exchange premium averaged 11.61 per cent. By the end of August 1922 Canada's currency had reached par. The exchange really amounted to a bonus for the gold mining industry. Canada is the first combatant country suffering currency depreciation as a result of the Great War to get back to normal.

Details of production are given in the following table:

Source	Ore milled	Gold Output		Silver Output	
	tons	ounces	Value $	ounces	Value $
PORCUPINE					
Dome	173,050	94,761.10	1,958,712	13,912.13	9,518
Hollinger	724,939	385,860.32	5,908,733	50,519.31	41,337
McIntyre	97,155	15,649.64	913,578	8,698.79	5,913
TOTAL	995,144	496,271.06	8,811,023	73,130.23	56,768
KIRKLAND LAKE					
Kirkland Lake	15,041	5,331.78	110,270	376.02	257
Lake Shore	13,171	13,272.63	274,545	1,086.03	751
Ontario Kirkland	6,196	483.25	9,989	112.88	75
Teck Hughes	25,011	10,892.87	225,165	894.15	605
Wright Hargreaves	13,477	19,065.67	394,087	227.11	1,108
Kirkland Lake Proprietary	5,458	950.03	19,647	292.38	210
TOTAL	98,560	49,999.23	1,033,193	3,218.60	3,104
MISCELLANEOUS					
Nickel Copper refining, etc		68.03	1,324	26.50	17
GRAND TOTAL	1,093,704	476,338.32	9,845,910	76,405.33	59,889

Silver

Silver production shows an increase over the corresponding period in 1921. Since the end of June the McKinley Darragh and Dominion Reduction Company have been operating their mills. South Lorrain is attracting attention owing to the satisfactory developments on the Keeley and Frontier properties. Some very fine slow samples of leaf silver have been found recently on the Frontier. The Castle mine at Gowganda is also meeting with encouraging results.

The average New York price for the period was 67.34 cents per ounce as compared with 59.9 cents in 1921 and $1.17 in 1920. Shipments over the T. & N. O. Railway from Cobalt of ore and concentrates totalled 474 tons to Ontario and 385 tons to points in the United States. Mines shipping over 200,000 ounces are given in order: Nipissing, 2,167,265; Mining Corporation of Canada, 701,891; Coniagas, 647,544; O'Brien, 539,768; Keeley, 298,806; La Rose, 244,221. A summary of output is given hereunder:

Shipments from Cobalt, South Lorrain and Gowganda,	Ounces 4,697,335	Value $3,219,326
Recovery from gold ores,	76,405	53,284
Recovery from nickel-copper refining,	926	637
	4,774,666	$3,273,247

Refineries: The coniagas plant at Thorold has been overhauled, the process changed and the company reorganized under the name of The Coniagas Alkali and Reduction Company, Limited. The new company did not receive any shipments for treatment during the period but marketed materials on hand. No residues were received by Southern Ontario Smelters during the half year, but subsequently, owing to reduced freight rates, shipments have been made both to Thorold and to the Deloro Smelting and Refining Company, Limited, at Deloro. Ontario Smelters and Refiners, Limited, with plant at Welland went into the receivership of the Trusts and Guarantee Company of Toronto on May 30th.

Nickel-Copper

Owing to the continued overstocked condition of the copper and nickel markets mining, smelting and refining operations have been greatly curtailed. The Mond Nickel Company was the only smelter operated, treating 93,148 tons of ore and producing 4,535 tons of nickel-copper matte, the two other smelters remaining closed. The International Nickel Company of Canada reopened its Port Colborne refinery on May 1st and treated 1,269 tons of matte. Nickel-copper matte on hand at Bayonne, N. J. (1,094 tons) was reshipped to Port Colborne, where all refining operations will be conducted hereafter. The Bayonne plant has been scrapped, and some of the equipment shipped to Port Colborne. During the dull period new uses and new markets have been found for nickel, and as a result the Copper Cliff smelter was restarted on September 1st, two converters being placed in commission. The Creighton mine was reopened a week previously. All mining and smelting operations by this company were suspended in August, 1921. The average price of electrolytic copper for the period was 13.02 cents per pound.

Production of Non-Metallics and Structural Materials

Product	Quantity Year 1921	Quantity First half 1922	Value $ Year 1921	Value $ First half 1922
NON-METALLIC				
Apatite ..... tons	.....	31	.....	248
Actinolite ..... tons	78	.....	975	.....
Arsenic, crude & white .. lbs.	2,982,525	2,438,731	233,763	163,318
Corundum ..... tons	402	.....	50,250	.....
Feldspar ..... tons	15,506	5,676	114,059	45,205
Fluorspar ..... tons	115	123	1,744	1,486
Graphite ..... tons	363	330	23,273	17,032
Gypsum ..... tons	84,765	44,932	433,053	260,670
Iron Pyrites ..... tons	19,375	5,846	91,604	20,486
Mica ..... tons	222	215	29,630	17,076
Mineral Water ..... tons	.....	.....	9,000	2,965
Natural Gas ..... M. Cu. ft.	8,532,234	3,863,000	2,975,502	1,638,400
Peat ..... tons	500	1,860	2,000	9,300
Petroleum ..... bbls	172,859	76,003	466,716	218,888
Quartz ..... tons	12,957	6,957	74,635	9,843
Salt ..... tons	149,599	87,775	1,509,287	926,938
Talc ..... tons	9,967	6,706	140,390	86,472
TOTAL			6,155,984	3,418,327
STRUCTURAL MATERIALS				
Clay Products - brick, tile, pottery, sewer pipe ..	.....	.....	3,885,199	2,758,500
Cement, (Portland) .... bbls	2,723,072	.....	6,425,266	4,062,000
Lime ..... bush	2,610,129	.....	1,172,680	832,500
Sand and Gravel .... cu. yds	1,412,956	.....	668,098	474,500
Sand-lime brick ..... M	.....	.....	456,700	324,500
Stone	.....	.....	1,812,863	1,287,000
TOTAL			14,420,806	9,739,000
GRAND TOTAL			20,576,790	13,157,327

* Estimated.

Iron Ore and Pig Iron

Moose Mountain, Limited, shipped beneficiated magnetite in the form of briquettes to Electro-Metals, Limited at Welland, makers of ferro-silicon.

Only three iron furnaces were in blast during the period, two operated by the Algoma Steel Corporation and one by the Steel Company of Canada. Of a total of 337,637 tons of ore smelted only 19,843 tons or 5.88 per cent. was of Ontario origin. In addition to the pig iron product mentioned in the table 164,616 tons of steel worth $5,567,256 were produced.

Lead

Ontario's only operating lead mine and smelter, situated at Galetta on the Ottawa river, are operated by the Kingdon Mining, Smelting and Manufacturing Company. The recovery noted in the table was made from 22,770 tons of ore. A blast furnace is being installed to treat the slag and flue dust which have accumulated from the Scotch hearth. A small recovery of lead is made from Cobalt silver ores by certain refineries in the United States, returns of which are received at the end of the calendar year. The average New York price of lead for the half year was 5.07 cents per pound.

Non-Metallic Minerals

Heretofore data have been compiled annually for non-metallic minerals, hence the returns of output for the first six months of 1922 cannot be compared with a similar period in 1921 and for that reason the figures for the full year 1921 are given. It will be noted that in 1922 arsenic, graphite, gypsum, mica, peat, salt and talc show an increase in output over half the total figures for 1921. Arsenic is in good demand and an insecticide plant is in operation at Deloro to use part of the product there recovered from the refining of silver-cobalt-nickel arsenides. There is little activity in mica mining except in scrap mica, the prices for thumb-trimmed not being sufficiently high for profitable operation.

Structural Materials

No statistics were received from producers, the estimate being based on the relative activity in construction in 25 Ontario cities as revealed by a comparison of the value of building permits issued for corresponding half-yearly periods in 1921 and 1922. The figures respectively are $24,421,333 and $34,685,905 or an increase in value of 42 per cent. in 1922.

News and Comments

by ALEXANDER GRAY

Abestos Manufacturing Company of Canada

So long as there is a "fair field and no favour," whatever will promote the fabrication of Canadian raw materials—"prosaic minerals" if you will, metallic and non-metallic—it is the bounden duty of Canadians to rise up and call those who undertake bona fide enterprises, "blessed — thrice blessed." That is why the activity of the Hon. P. J. Paradis, M. L. C. Quebec, President of the Asbestos Manufacturing Company, Limited, is hailed with satisfaction by the Montreal and Quebec press. Mr. Paradis proposes to interest British capital already invested in asbestos products, in his manufacturing company, whose plant is at Lachine, and was operated by the Keasbey & Mattison people. The intention is to increase the capital of the Asbestos Manufacturing Company from $1,000,000 to $2,500,000, and by enlarging the Lachine works and effecting close co-operation with the British interests, to materially increase the production of fireproofing, textiles, packing, shingles, etc.

"A world-wide business that will be one of the main distributors of asbestos," is the general objective of the contemplated merger, the accompanying assurance being that "the British firm referred to is one of the largest in England," probably of Manchester and of "Everight" reputation. The assumption that it is Messrs. Felber & Jucker who are joining with Mr. Paradis may not be accurate; but the Turner interests are not in the deal and other asbestos manufacturing concerns in Great Britain have their own plants. The Bell people are not involved. The Johns-Manville are to have their own Canadian factory. That is why the names of Messers. Felber & Jucker are associated with the mooted merger.

At any rate, the matter will be settled in London. That it should be injected into the announcements, that "reports circulated at the last session of the Quebec Legislature to the effect that the Provincial Government was studying the advisability of levying a special tax on raw asbestos exported to other countries, have already brought results," is not conducive to the harmonies, since Mr. Paradis is Government Whip. However desirable it is to have a complete performance within Canada it is more desirable to maintain the welfare of the Industry as a whole. While Washington is not very considerate where Canadian mineral industries are concerned, it has made certain exemptions in the pending Tariff Bill. The greatest factors in the Asbestos Industry now are ready to conform to Canadian ideals in every way possible; but the situation is a delicate one, and it might be prejudicial to use the bludgeon where moral suasion will more than suffice. Moreover, the "Manchester" policy of buying in the cheapest market—the free trade principle—might present Quebec with a reaction.

South Tisdale Northern Deloro Shearing

Newspaper announcements that a discovery has been made on the Ritchie "Vet," west of the Dome, and that the Paymaster property in Deloro is exploiting a porphyry section, has the same relative importance to the Porcupine fields as the developments on the Rochester "Vet," the Goldale, and elsewhere in the Pearl Lake area. Every shear zone may not be "another Dome," and every contact may not disclose "another Hollinger" or McIntyre; yet experience has shown that those structural conditions are very promising. Dome Extension, though not "unwept," certainly was "unhonored and unsung," despite Capt. Anchor's persistent optimism. Dome shearing did not stop at the Dome boundary. West Dome was [illegible] handled. Dome Lake was "married in haste [illegible]

mill and "reported at leisure" The Preston East Dome was named after one of the Dome discoverers, but it had more water in its capital than exaggerated prospects could de-water. Preston East Dome, without adequate working capital and the necessary supreme management, had to await the fuller appreciation of the Dome Mines structure. And now the Paymaster, formerly the Standard, of "salted" core (unsavory memory) is said to have more than a chance along a porphyry intrusion. Of course it will take more than can be winnowed from small-fry speculations to prove the shearings, whether they have more of shadow than of substance. Nevertheless those zones are benefiting from Dome and Dome Extension results, the acquisition of the Schumacher "Vet" by the McIntyre Company, and the general statements about those properties, including the Ritchie "Vet."

Ankerite became anathema at Dome Mines and the adjoining areas. The "Foster Vein" at the West Dome, looked as comfortable as a church warden before a cheery fire, but it really was as hungry as the proverbial church mouse. Porphyry contacts, however when financed by those in a position to take a loss or raise more money, may make Deloro what its name implies. It is nearly twelve years since I heard a wiseacre proffer $300,000 for the Ankerite Company's outcrops—as spectacular almost as that of the Paymaster, or Standard. Well, the Ankerite property was developed to some extent, as were Dome Extension, and West Dome and Dome Lake and the Edwards ground. Ankerite without porphyry contacts "gave the dog a bad name," as it were, until Dome Mines provided an agreeable surprise. Likewise the porphyry contacts around Pearl Lake have moved back the horizons until the mining area is larger and the outlook wider. To ascertain when a shear zone is not a sheer waste of country, though, will take a sporting scientific spirit and many simoleons.

An Objective Worth Keeping In View

Those who rail at 'Rand Engineers and foresee the rapid decline of the unparalled gold fields of the Transvaal, have a suggestion conveyed to them in that for the first time in the history of the 'Rand, the gold output has exceeded half the world's production. Statistics just published by the Transvaal Chamber of Mines show that the output equal 52½% of the world's total. Since the commencement of operations, the 'Rand production has reached £666,000,000—roughly three-and-a-third billion dollars. The July production was equal to $12,700,000-for the whole of South Africa, apart from Rhodesia. So, those who graduated at, or took a post-graduate course at those fields have something in retrospect that others can place in perspective.

Business Men Appreciate Northern Ontario

It is refreshing to have the Toronto Board of Trade, after an official tour of the mining and agricultural areas of the North Country formally recommend that the Provincial Government enter upon a policy involving the annual expenditure of $10,000,000 in that section. The otherwise efficient Quebec Government, although unprecedentedly prosperous, concede a pittance toward providing transportation facilities for the mining sections of that Province. No greater inducement could be offered at this time, to capital and its representatives, than the assurance that Quebec is no less enterprising than British Columbia in the matter of roads to aid mining. To be specific: The Gaspé Peninsula (to say nothing of Western Quebec) has very great possibilities, and not a few certainties, but individual operating companies find themselves compelled to devote large sums to roads, whereas their working capital ought to go into their mines and equipment. The Ontario Northland may not get $10,000,000 year, but it is pleasant to have business men on record that the money should go there.

R. P. Doucet, General Manager, Sante!

Holding a record as a business go-getter and rapid fire conversationalist, Mr. R. P. Doucet will not be an experiment as the operating chief of the Asbestos Corporation. Mine Accounting is his other name. He is a polyglot personage, and under stress has been known to develop great lingnistic artistry. Always immaculately groomed, Mr. Doucet will fix the styles at Thetford. His intimate knowledge of the markets for every grade and familiarity with the men and affairs of the asbestos trade, does not imply that his middle initial means Powder; but he will find those who will do the shooting most economically, and if there is any below-the-belt work among produeers he will be his own referee. Every nook and cranny of the international fields has been personally scanned by Mr. Doucet. His assumption of the duties of General Manager of the largest producer no doubt will carry with it more than supervision of the operating department.

Coynite

If Mr. Coyne delivers the goods in quantities to meet a long felt want, and the "coal measures" of Larchwood present Canada with anthracite, he will be entitled to have his product indexed as Coynite. Otherwise—well, it will be Mr. Cyril Knight's privilege to find a suitable name for it. Failing this, Professor Haultain has a periodically demonstrated vocabulary outside the lecture-room.

Balfour Syndicate's Sporting Bet

Coal or no coal, anthraxolite or anthracite, the Balfour Syndicate of Toronto took the plunge by letting a contract to diamond drill the controversial Balfour Township area. Private money is doing it, there has been no special pleading, the hole is going down where the section seems to be least disturbed, and if there is coal "as is coal"—why the gamble will, or may, reward the gamboliers. They know exactly what to expect in either event. A coal seam—of coal—when proven over a sufficient area—would be a veritable Coyne of vantage. Reports on what has been done at surface by others, are not flattering to the promoters. The Balfour Syndicate, not having strained the "pregnant hinges" of their knees to enlist the public in a venture so largely speculative, all the more credit will accrue if coal is there in quantity and quality.

Johns-Manville-Bennett-Martin Deal

Drilling on an extensive scale is proceeding at the Bennett Asbestos properties at Coleraine, Quebec. The understanding is the deal with the Johns-Manville people is contingent upon the drilling results.

W. G. Trethewey Still Scouting

A report is current that an important find of high-grade silver ore has been made in Ontario near the Manitoba border. As W. G. Trethewey is interested and optimistic concerning it, he must have had a recurrence of those thrills when he received his first shipping returns on his Cobalt ores—and of those chills when he recalls how near he came to selling the Trethewey to that keenest of business men, Ellis P. Earle.

The Mining Districts

BY THE JOURNAL'S CORRESPONDENTS

SILVER STRIKE IN PATRICIA

There is no longer a doubt that some extremely rich silver ore has been discovered near Red Lake, in the district of Patricia, west of Lac Seul and toward the Manitoba boundary. The discoverers are H. W. Cann, G. E. Hoyt and R. G. Johnston. The last named has been hunting for silver for the past three summers, and according to one report found an old abandoned claim with the remains of a camp by the shore of Red Lake, and this led to the finding of a vein of silver lead ore, which the old timer had evidently discovered previously. Many years ago, just before the Klondike excitement, there were prospectors all through this part of Ontario, and they made a lot of finds, but generally could do nothing with them because of the entire absence of convenient transportation. When the tales of gold came from the Yukon they dropped their pans and picks and left for the newest El Dorado. None ever came back.

The present find is said to have yielded very high assays, and the ore evidently contains other silver-bearing minerals than galena such as for instance, native silver and stephanite. The country rock is said to be schist with diorite and porphyritic granite intrusions. The belt of silver bearing rock does not seem to be extensive, though it may be so. The richest ore comes from a streak a foot and a half in width, but according to some, values are found over fifteen feet.

Six claims have been recorded up to the time of writing, but a lot of men are expected to record within the next fortnight. About a hundred mining licenses have been taken out. There are indications of a rush—also, possibly, a raid on the crop money now coming into the hands of the farmers. Probably all our old friends of the Rice Lake boom of a few years back will turn up again, eager for more of the same "pap".—Chas. A. Bramble.

NORTHWESTERN ONTARIO NOTES

Northwestern Ontario is again coming to the fore as a mineral field of great potential wealth. Recent discoveries of silver deposits at Red Lake, in the Lac Seul country, are said to be of great richness. These deposits have been known in a more or less hazy way by prospectors for some years, and that territory has been commented upon as the scene of coming developments, by men who had some knowledge of it. W. G. Trethewey, a prominent and successful pioneer in the Cobalt field, has just returned after making an examination of the find, and pronounces it as being a likely rival to Cobalt in the future production of silver. The lateness of the season, and the difficulties of transport (it being a five day trip by the water route from the Canadian National Railways) will prevent any considerable exploration or development this season. Details of the discovery are lacking, but sufficient is known to ensure the attention of prospectors and investors.

Operations have been resumed at the Mikado Gold Mines in the Lake of the Woods district. Lt.-Col. H. A. C. Machin, of Kenora, recently reorganized this company under the name of the Mikado Consolidated Gold Mines, Limited, with an Ontario charter. The work of dewatering the mine is now underway. An inclined shaft is down about 600 feet, with rather extensive lateral development work performed. The property is equipped with a mill and the necessary mining machinery. Though somewhat out of date, these will be altered to suit modern requirements in the recovery of values. There are three thousand tons of broken ore in the mine, ready for the mill, and thirty thousand tons of commercial ore ready for stoping. When the unwatering process reaches the known ore body, milling tests will begin for the purpose of determining the best method of treating the ore.

Development work on the property of the Contact Bay Mines, Limited, situated about seven miles south of Dryden, on the C. P. R. west of Port Arthur, is proceeding satisfactorily. The property equipped with a ten-stamp mill, and test runs are constantly being made as development proceeds. These tests have been of the most encouraging kind, showing values of from $12 to $20 per ton in gold. Recently there was made a shipment of $3,000 in bullion to the Mint at Ottawa, being the result of the test runs. This company has recently purchased the Redeemer mine, situated about two miles west on the same vein system. The purchase price is said to be $150,000.

Prospecting is very active in the Sabawe Lake district. A large number of claims have been staked and recorded. The formation in this field is most favourable for gold occurrences, and many promising finds are reported. This territory is in the Fort Frances Mining Division, and as there is no Mining Recorder resident in the Division, all claims have to be recorded at Toronto, resulting in much loss of time, and causing stakers great inconvenience. This could be avoided by having these claims recorded at Port Arthur.—J. J. O'Connor.

NORTHERN ONTARIO

Toronto Men Visit Northern Ontario

A group of seventy business men, members of the Toronto Board of Trade have just returned from a visit to the different camps, agricultural sections and pulp mills of Northern Ontario. A day was spent in Cobalt and the adjoining towns and in the evening a banquet was tendered the visitors by the local boards of trade. On occasions such as this it seems to be an unfortunate habit for local speakers to make a specialty of airing grievances. Northern Ontario has a number of grievances against the southern part of the province, some of which are very well founded, but little good can result from bringing forward a large number of criticisms on only a few of which visiting associations can act.

Many of the visiting business men were making their first visit to the north and they were greatly impressed with what they saw. There is no doubt that trade relationships will be strengthened and also that the visitors will be more alive to the needs of this fast growing country. Mining is, of course, the great industry of the country and one of the Cobalt speakers pointed out that to date the mines of this province have paid out for

labor, supplies and equipment practically one billion dollars, a large part of which, either directly or indirectly, has gone to the farmers and business men of Old Ontario.

Residues Shipped from Cobalt

Heavy shipments of residues continue to be made from Cobalt and for the week ending September 8th, the Nipissing and the Mining Corporation shipped a total of 844,000 pounds to Deloro. La Rose was also a shipper with one car of 80,000 pounds of high grade concentrate. No decision has yet been made as to milling arrangements for the O'Brown, but it is understood that they are negotiating for the purchase of the Bailey Mill.

Mr. A. A. Cole, mining engineer for the T. and N. O. Railway recently made a visit to Moose Factory on James Bay, by airplane. The visit was made with an idea of getting a general view of the country in anticipation of the possible extension of the T. and N. O. The return trip used to be a matter of weeks, but it can now be accomplished in a few hours.

The Nipissing is preparing to reopen shaft No. 26 with the idea of getting some high grade mill rock and also exploring the lower Keewatin-diabase contact, on which the company has already done some diamond drilling. The work at the Colonial has no doubt stimulated the Nipissing in this direction.

Colonial Shaft

Rapid progress is being made in the sinking of the Colonial shaft to 900 feet, and this work promises to establish a shaft sinking record for Northern Ontario. The work is in charge of J. Hussey, who at one time held the shaft sinking record for South Africa. Six machines are used and the three compartment shaft is drilled off in one shift. A new head-frame is being installed and a two-ton sinking skip will be used. A great deal of time is gained by having separate timbering crews, who do the timbering while drilling is in progress.

Several veins have been encountered in the 450-foot level crosscut of the Victory.

More Ore at Castle Property

High grade ore has recently been struck on the 160 and 325-foot levels of the Castle property in Gowganda which is rapidly developing into an important mine. The directors are considering the installation of a 50-ton mill.

Wright-Hargreaves Dividend

The Wright-Hargreaves property at Kirkland Lake, which started production only sixteen months ago, has declared a 5 per cent. dividend payable October 1st, to shareholders of record September 17th. This makes the third dividend for the present year and puts the company in the position of being the second largest dividend payer in the camp. The total disbursements of the Lake Shore are slightly ahead of the Wright-Hargreaves, but the latter company will soon take the leadership.

Dividend for Teck-Hughes

It is quite possible that the Teck-Hughes may soon enter the ranks of the dividend payers, as it is understood that some of the heavy bond holders are anxious to see dividend payments started before all the bonds are paid off. There is no reason why this could not be done as the company is making very substantial profits. There have been various rumors from time to time of an amalgamation of the Teck-Hughes and the Orr. As the properties adjoin and the same vein runs thru both this would seem to be the logical thing; but officials of the Orr state that there is "nothing doing", although the property is open for sale.

Porcupine Prospects

Crosscutting has been started on the 125-foot level of the Rochester property in Porcupine, which adjoins the Hollinger, and it is expected that several veins will be intercepted.

The Paymaster reports the discovery of rich ore on the 300-foot level. Officials state that there is sufficient ore developed in the mine to justify the erection of a mill.

The Bison Gold Mines, Limited, has been formed to take over a group of properties lying between the Paymaster and the Clifton.

Skead Property Optioned

A. D. Miles, on behalf of English capital, has taken an option for $250,000 on the property of the Skead Gold Mines.

Shaft on Hurricana Property

Preparations are being made to sink a 500-foot shaft on the Martin property in the Hurricana district Quebec, which is under option to J. J. Godfrey and associates of New York.

NOVA SCOTIA

THE MINE EXAMINER'S WORK

To examine a mine in the dead of night when men are out of it and everything is still except the falling of a piece of rock or coal is responsible and weird work. Accompanied by his boy (for in Nova Scotia the Mining Act gives every examiner a companion to give warning in case of accident and help in other ways), the preliminary walk of two or three miles is hastily made and the examination begun. The work must be finished within the prescribed time of three hours, if gas has been found in the mine within three months.

Gas Detected by Safety Lamps

If the walk has been along the return airway, care has been taken to make frequent tests of the mine atmosphere to find out what percentage of mine gas (CH_4) it contains. When the working sections are reached the examination of the working faces begins. Here the flame of the safety lamp, which at best gives only a dim light, is lowered to a length of, say ¼ inch. Care must be taken in walking, for the slightest mis-step or stumble puts the tiny light out, and the floor of the working face of a coal mine where coal in blasting has been thrown out in all directions is not as smooth or clean as that of a house.

The lamp is now held is a position where the trained eye of the examiner can note the slightest change, either in the length or the color of the flame. Gently the lamp is raised towards the roof. If gas is present, it burns with a blue cap directly above the flame. Before this occurs, however, the flame may become slightly elongated or it may be seen to jump as if jerked upward by some unseen force. This is the effect of mine gas and if the examiner keeps pushing his lamp into the gas instead of slowly withdrawing it, the lamp fills and an explosion takes place within that puts the light out. It is only the inexperienced workman who bungles at such a critical time and place.

In former days, before self-lighting lamps were made and examiners did their work alone, to get "into the dark," as miners say, meant a walk of possibly a mile or more through the dark chambers of the mine to a re-lighting

station; so examiners had to be very careful to keep their lights. Sometimes the mine laws or rules permitted the examiners to carry a lamp key and matches, but there came to be a strong suspicion that more than one explosion was caused by examiners opening and lighting their lamps while in the gas zone, although they evidently believed they had crawled far enough out of it to be safe. Mine explosions in such cases leave little evidence of the cause except an open safety lamp, and these have been found.

Black Damp to Extinguish Mine Fires

Black damp (CO_2) is another gas common to Nova Scotian coal mines. Its effect on a light is to extinguish it; but men can live where a light dies out so there is ample time to retrace one's steps should the light be seen to grow dim and slowly go out. Great bodies of this gas gathered during the days of the strike, but as its only danger is from suffocation it is not feared as is the more inflammable methane (CH_4), which haunts the higher places and is always found there. Indeed, black damp is rather welcomed in a mine subject to spontaneous combustion, and there are mine managers in Nova Scotia who are experts in damping out mine fires by means of using carbon dioxide. As the specific gravity of this gas is much greater than firedamp, a change in the atmospheric pressure is immediately felt.

Oil Used is Important

When gas is found it is reported in the day book, the place, kind and quantity being noted. This requires experience and a thorough knowledge of the type of safety lamp and the kind of oil used. The lighter oils such as kerosene, gasolene, and naptha, while detecting lower percentages of gas in the mine atmosphere are, because of their high temperature flame and the inflammable vapour or gas given off within the lamp, less reliable and more confusing to the examiner than the heavier oils, such as sperm and vegetable. The trained examiner, given any type of lamp or any oil or compound, quickly becomes accustomed to them and can within a very short time give a report correct enough for all practical purposes of the gas found in the place examined.

The reporting of the examiner has undergone changes like many other things, and more up to date methods of reporting are being worked out. With a standardised safety lamp examiners will be expected to give the exact quantity in feet of gas found in any one place while conducting their examinations. This is a long departure from the daily report of former days, in which the examiners stated that indications of gas had been found. One day a mine manager, puzzled by the vagueness of one of these reports, placed a footnote on it asking what an indication of gas was. Since then, gas, or no gas, has been reported.

Low atmospheric pressure permits of an outrush of gas from the gobs and a greater diffusion of gas from the coal face. Nova Scotia mine examiners know this and have been taught to take the barometer readings and to search for gas in unexpected places during times of low pressure. This is an extra precaution found necessary by practice, although theory is far from unanimous that atmospheric pressure makes much difference at the mine face. It does make a difference, however small it may be, and that is the reason why a greater amount of gas is actually found at such times.

Precautions for Safety

The word "Danger" written on a Board or any other plane surface underground, especially near the working faces, has a most startling and arresting effect. There is no miner so reckless as to try to pass this warning, for lurking unseen is his subtle enemy, mine gas. He fears it, and not without reason. If large bodies of gas are present he prefers to be out of the mine when they are being removed. He knows that a slight injury to a safety lamp may cause an explosion and he prefers to take no chances except when necessary. Millions of feet of gas were safely removed from Cape Breton collieries when the great fans were got going lately, and in a day or two the reports of the examiners showed all clear. The dangerous practice of walling off large bodies of gas is not permitted in Nova Scotia collieries.

In addition to the regular examiners there are the Company inspectors and the government inspectors. These latter have large powers. They supervise everything and everyone, from the trapper to the manager, and from the surface to the farthest recesses of the mine.

Sometimes the miners of a colliery become doubtful about the condition of their colliery. They believe it to be dangerous. Provision has been made by which a committee of workmen may enter and inspect the mine and report to their fellow workmen. This gives confidence and men become satisfied and work without fear.

Some one once said that no coal mine is ever absolutely safe, and no mining men will deny this. Acting on this assumption, every known precaution is taken to make them safe, and if at times workmen voice any suspicion of unsafe conditions, they are welcome to make inspection. For no matter how much men and management may differ on other matters, safety is the first consideration for all.

Bunker Trade Active

When the strike ended, a large number of vessels were in Sydney harbour, waiting for coal. With the steam shovels going in the coal heaps and the output of the collieries becoming normal in the first few days, these were quickly loaded. In their absence coal was placed on the coal heaps. At it appears at present, both the Company and the miners are going to make up some of the losses due to the strike, and by the end of the year the Eastern coal market should be fairly well filled.

Short Strike at Toronto Mine

Considerable agitation took place at one of the smaller collieries, the Toronto mine, over the placing of men, and a short strike ensued. But when matters were explained by the Executive, work was resumed.

To Regain Montreal and St. Lawrence Market

The agreement between the Empire Steel Corporation and its employees has not yet been signed, although it is in the hands of the Executives of the men. It takes some time to discuss the large number of class rates and to consider the changing conditions at the different collieries. There is, however, no apprehension in the minds of those directly interested as to its final ratification by both parties. What some are asking is how far it will permit of steady employment in certain districts. Cape Breton, especially the Glace Bay district, is the one where conditions are most favorable and where the outputs are large. Here at least all expect more continuous work. The renewed activity at the steel plant will do doubt give more employment at the collieries. But all eyes are looking to the Montreal market to greatly increase its buying of Nova Scotia Coal, and there will be considerable disappointment if at the end of the year a large trade has not again been found in the Province of Quebec.

BRITISH COLUMBIA

Important Copper Deposit at Sidney Inlet

Important developments are reported from the Tidewater Copper Co. Ltd., Sidney Inlet, Vancouver Island. There is a large body of ore, assaying 2 per cent. copper and carrying a little gold and silver, blocked out on the Indian Chief Claims that will keep the concentrator in feed for at least two years. As soon as sufficient water is available, and this should be the case within two weeks, the mill will be put in operation. A crew of miners is being engaged and will be put to work immediately.

About a year and a half ago a new body of ore, locally known as the "Price" deposit, was opened up on the Indian Chief by diamond drill. This was discovered on No. 2 tunnel level at an elevation of 1550 feet and about 800 feet nothwesterly from the portal. This was in virgin ground and since then it has been developed by opening drifts and crosscuts and an upraise and is proved for a length of 230 feet on No. 2 level and to a heighth of 170 feet. Between March and May last some 6,000 tons of ore from this body have been mined and concentrated. In May the mill was closed down owing to dry weather and since then the ore body has been developed for an additional depth of 890 feet below No. 2 level and for a length of 200 feet.

With this ore in sight and fall rains supplying water, the management are looking forward to the immediate future with satisfaction.

Reported Sale of Engineer Mine

It is reported from Atlin, B.C. that the Engineer Gold Mine has been sold to the Timmins interest of Ontario. This information appears to be based on the fact that some representatives of Timmins Brothers were on the property this summer. No figure is mentioned. It is clear, of course, that any sale would be contingent on the outcome of the present lawsuit between the heirs of Captain James Alexander and the old Engineer Mining Co.

Trail Ore Receipts

Ore receipts at the Trail Smelter, Canadian Consolidated Mining and Smelting Co. for the week ending August 31st totalled 12,131 tons. Twelve mines contributed, in addition to the mines of the Company. The Monarch of Field, made its first shipment this year. Shipments were made by four Slocan mines, the Silversmith contributing 191 tons of lead and 178 tons of zinc concentrate. The Company mines shipped 10,988 tons.

Strike near Grand Forks

An important strike is reported to have been made on the Maple Leaf mine, in the Franklin Camp near Grand Forks. It is the intention to sink 50 ft. and to drift to determine the size of the lead. Assays are most encouraging.

Asbestos near Yale

Two deposits of asbestos are reported in British Columbia. One of these is located in the Yale District about 80 miles from Vancouver. The owners says that his development and investigation has convinced him that his property can be made of commercial importance. Another body much similar in character also has been reported to officials of the Vancouver Chamber of Mines.

Kitsault Valley Trail

Considerable work in trail construction has been done in the Upper Kitsault Valley, Alice Arm, this summer. The most important undertaking is an extension of some length beyond the inland terminal of the Dolly Varden Railway. This, it is hoped, will be completed before the snow flies. It will furnish means of transportation to a number of promising prospects.

Railway for Portland Canal District?

Charles F. Caldwell, well-known mining operator and a prominent Zionite, has returned after an inspection of some Portland Canal prospects. He holds a charter for a railway up the Salmon Valley and states that he may have some interesting announcement to make soon relative to the construction of the road.

2,000-foot Tunnel in Portland Canal District

J. C. Weir of Weir Brothers & Co., New York, and R. I. Claus, also of New York, recently returned after inspecting the Daly-Alaska group, Portland Canal, now under bond to Pat Daly. Mr. Weir states that a 2,000-ft. tunnel will be driven and other important development undertaken. Mr. Weir spoke highly of the mining possibilities of the district and commended the Governments of British Columbia and Alaska for their enterprise in road building.

Synthetic Nitrate Plant

Plans are being formulated for the development on a large scale in British Columbia of nitrogen products by the synthetic method that will make Canada independent of outside sources for its supply of nitrates. C. F. Graff, President and General Manager of the American Nitrogen Products Co. states that the Company's plant at Buntzen Lake is only a beginning. The concern has in view the establishment of a plant with its own water power and has secured deposits of natural soda and limestone in different parts of the Province. There are deposits of this nature of considerable size near the town of Clinton on the P. G. E. Railway. Others exist on Texada Island in the Gulf of Georgia.

Three-year Agreement by Negotiation

Underground employees of the Western Fuel Corporation Ltd., Nanaimo, B.C., are preparing the basis for a new agreement with their employers which, it is the intention, shall subsist for three years on and from the 1st of October next. Their desires have been placed in the form of a Report which will be submitted to representatives of the management and are interesting, not alone because of the several demands made, but as well as illustrating the amicable and even friendly relations that appear to exist, at present at least, between the men and the company.

As to the matter of wages, and the payment rates on rock work, timbering etc., the men, of course, are asking for increases. These phases of the Report are open to negotiation and there is every reason to believe that on such points an understanding, satisfactory to both sides, will be reached. One of the gratifying features to those desirous of seeing the industry maintained on a productive footing is to find that provision is made for the permanent establishment of an Agreement Committee which, it is proposed, shall hold monthly meeting with a similar body to whom the management delegates authority. Before these two Committees, or rather this joint Agreement Committee, will come everything of a contentious nature

for settlement and, in this connection, the following striking phraseology is used:

"—it being distinctly understood that there shall not be any stoppage of work by employees, individually or collectively, pending the hearing of and adjusting of any dispute or grievance during the term of this Agreement."

The men ask that they be paid a standing bonus of $1.25 a shift per man in place of the present bonus of 88 cents granted by the Cost of Living Commission. If this cannot be done they want a 10 per cent advance on the base rate together with the present bonus. The Company is requested to agree to a minimum rate of $4.25 and bonus per shift for miners in all mines covered by the proposed Agreement, the Agreement Committee of Miners to be judges as to the ability of the miner to earn such minimum. Schedules of rates of pay for rock and timber work are detailed. A six hour day for Saturday is sought and it is provided that employees shall be able to buy the best quality of domestic coal for $2.50 a ton. To those living outside of coal mining centres, who have to pay from $12.00 to $14.00 per ton for their coal, it would seem that there are some compensations to place against the hazards of a miner's life.

Old time Coal Mining

Conditions have vastly changed in the last half to three quarters of a century for those engaged in coal mining on the Pacific Coast. Memoirs of ex Mayor Mark Bate, of Nanaimo, B.C., show that old timers of that town received seventeen pounds sterling per year and rations for coal mining. They were imported from England by the Hudson's Bay Company. The twelve hour a day working schedule prevailed.

Mr. Graham Thanks Coal Miners

Mr. Thomas Graham, general superintendent of the Canadian Collieries (D) Ltd., has published the following statement, which explains itself.

"Kindly give me a small portion of your space to convey to the injured and the relatives of the dead in our recent deplorable accident (the explosion at No. 4 Mine, Cumberland is referred to) the sincere sympathy of the President, Directors and Management of the Canadian Collieries (D) Ltd.

"To express the appreciation and thanks of the Company and its Official Staff to all who in any way rendered assistance and sympathy.

"To those who volunteered their services, whether outsiders or employees, we feel deeply indebted.

"To mention any one in particular, where so many responded and did so well, would be invidious, yet we cannot refrain from special reference to Miss Ballati, of the local Hospital Staff, who in keeping with the best traditions of her profession, forgot self and entered the mine immediately following the disaster, and with the Medical Staff rendered such timely and signal First Aid to the suffering injured.

"To our employees we also desire to express our sincere appreciation of the hearty and almost unanimous response to the call for work on Labour Day.

"Realizing that of all days in the year Labour Day is specially your day it was with deep regret and only under most urgent circumstances that the call was made.

"Your hearty response was another tribute to that spirit of toleration and co-operation that has dominated all of your relations with the Company during the past five years."

Boring in Copper River Coal Field

Exploration of the Copper River Coal Fields, northern British Columbia, is proceeding with satisfactory results. The first bore struck the seam at between 600 and 700 feet. Two more test bores are to be sunk. These fields are situated in the vicinity of the Grand Trunk Pacific Ry.

Disagreements all Settled

All union coal miners are back at work in District 18 (Eastern B. C. and Province of Alberta). The last dispute in this section was between the men and the management of the Big Horn and Saunders Creek Collieries. An agreement, however, now has been reached as to the "check off" and the mines of the district all are producing again.

Mine Accidents

A small cave-in at No. 1 South Mine, Crow's Nest Pass Collieries, recently killed a miner named Dan Bodak. George McAndrew, his partner, was injured.

A fire Boss and a miner were killed at No. 5 Mine, Middlesboro Collieries, Nicola-Princeton District, by a cave in on September 13th.

Investigation of Mine Explosion

While the results of the inquiry into the cause of the disaster of August 30th, which occurred in the longwall workings off the slope of No. 20 East Level, No. 4 mine of the Canadian Collieries (D) Ltd. near Cumberland, B.C., have not been announced, the opinion is generally held that the explosion had its source in the ignition of gas in a cavity on the side of the roadway. It is known that the electric wiring connecting the coal cutter was dislocated, and whether there was a flame at this time that was responsible, or whether there was a shot fired that ignited the gas, are points that are expected to be cleared up. Three white men and fifteen Oriental underground workmen lost their lives in the outbreak and, at the Coroner's Inquest held on Friday, September 8, a verdict was brought in that the deaths were the result of "suffocation and burns." Examination of the workings has been made both by George McGregor, Chief Inspector of Mines, and George Wilkinson, mining engineer and former Chief Inspector for British Columbia. Their reports, it is understood, are in course of preparation. The mine has been repaired and the colliery is again on a production basis.

Outbursts of Mine Gas at Cassidy

George S. Rice, of the United States Bureau of Mines, who has been in British Columbia on unofficial business relative to gas outbursts in the Cassidy (Vancouver Island) coal mines, Granby Consolidated Mining and Smelting Co. Ltd., has left for the East. It is understood that Mr. Rice was engaged by the Company to make an examination of underground conditions at Cassidy and submit recommendations as to how best to deal with serious operation problems with which the management has been faced of late. The outbursts referred to have been occurring with more or less frequency of late. They give little warning and dislodge considerable amounts of coal. Although the measures taken have protected the men, as a rule, there have been fatalities. The British Columbia Department of Mines has been investigating the problem, and the Company, appreciating the necessity for action, has called in Mr. Rice, one of America's acknowledged authorities.

The Dominion Bureau of Statistics states, in its advance summary of coal imports for the first eight months of 1922, that for anthracite coal, a total of a little over a million tons has been imported as against three million average during a like period in 1919-1920-1921. Bituminous coal totalling three and one-half million tons has been imported, which is half the average for the former years. Exports total a million tons, which is three-quarters of the normal amount exported.

To Holders of Five Year 5½ per cent Canada's Victory Bonds

Issued in 1917 and Maturing 1st December, 1922.

CONVERSION PROPOSALS

THE MINISTER OF FINANCE offers to holders of these bonds who desire to continue their investment in Dominion of Canada securities the privilege of exchanging the maturing bonds for new bonds bearing 5½ per cent interest, payable half yearly, of either of the following classes:—

(a) Five year bonds, dated 1st November, 1922, to mature 1st November, 1927.

(b) Ten year bonds, dated 1st November, 1922, to mature 1st November, 1932.

While the maturing bonds will carry interest to 1st December, 1922, the new bonds will commence to earn interest from 1st November, 1922, GIVING A BONUS OF A FULL MONTH'S INTEREST TO THOSE AVAILING THEMSELVES OF THE CONVERSION PRIVILEGE.

This offer is made to holders of the maturing bonds and is not open to other investors. The bonds to be issued under this proposal will be substantially of the same character as those which are maturing, except that the exemption from taxation does not apply to the new issue.

Holders of the maturing bonds who wish to avail themselves of this conversion privilege should take their bonds AS EARLY AS POSSIBLE, BUT NOT LATER THAN SEPTEMBER 30th, to a Branch of any Chartered Bank in Canada and receive in exchange an official receipt for the bonds surrendered, containing an undertaking to deliver the corresponding bonds of the new issue.

Holders of maturing fully registered bonds, interest payable by cheque from Ottawa, will receive their December 1 interest cheque as usual. Holders of coupon bonds will detach and retain the last unmatured coupon before surrendering the bond itself for conversion purposes.

The surrendered bonds will be forwarded by banks to the Minister of Finance at Ottawa, where they will be exchanged for bonds of the new issue, in fully registered, or coupon registered or coupon bearer form carrying interest payable 1st May and 1st November of each year of the duration of the loan, the first interest payment accruing and payable 1st May, 1923. Bonds of the new issue will be sent to the banks for delivery immediately after the receipt of the surrendered bonds.

The bonds of the maturing issue which are not converted under this proposal will be paid off in cash on the 1st December, 1922.

W. S. FIELDING,
Minister of Finance.

Dated at Ottawa, 8th August, 1922.

EDITORIAL

So let the farmers have for themselves the fruitful fields and cultivate the fertile hills for the sake of their produce; but let them leave to miners the gloomy valleys and sterile mountains, that they may draw forth from these, gems and metals which can buy, not only the crops, but all things that are sold.—Georgius Agricola—1550. (Hoover's Translation.)

A FORECAST

The results of long-continued and systematic research into the possibilities of the low temperature carbonization of coals and lignites are dispassionately reviewed in the Report of the Fuel Research Board (Great Britain) for the years 1920-1921. *Inter alia*, it is apparent that the public claims of enthusiasts and promoters of special processes must be seriously discounted. The Board's Report serves a good purpose in stripping away all fancies and placing facts, and facts alone, before us.

So far as present knowledge goes, the standard yield of one ton of bituminous coal, under low temperature (600 deg. C.) treatment is approximately as follows:

Yield of coke, pounds	1,500
Yield of crude oil, gallons	15
Yield of "liquor", gallons	11
Yield of ammonium sulphate, pounds	6.5
Yield of gas, cubic feet	3,250

These figures, of course, will vary within fairly wide limits; but they may be taken as typical of the larger range of coals that are now amenable to low temperature carbonization. This range has been made much wider by the discovery that the admixture of "non-caking" and "caking" coals gives good results and tends to facilitate the control of operations.

In Canada we continue, despite shortages and all the dictates of common sense, calmly to waste irreplaceable fuel by direct firing. No refinements of practice can make this method economical for it is in essence an extravagance. Can any consideration palliate the stupidity of being content with one fifth of the potential energy that we *can* get out of coal?

The industrial centres of Canada at which domestic fuel suitable for low temperature carbonization is available are Halifax, St. John, and the smaller cities of the Maritime Provinces, Quebec, Montreal, Edmonton, Calgary, Regina, Saskatoon, Vancouver and Victoria, with the possible inclusion of Winnipeg. In other words all of Canada, excepting Ontario, can within ten years, be made self sustaining in the items of industrial fuels, including gas, fuel oil and gasoline. In addition, enough lubricating oil could be produced to supply the whole country's needs, and sufficient coke for all purposes.

Let the reader pause here and digest the fact that this is not a dream. It is the goal that leaders of technical thought in Great Britain are yearly and daily approaching.

Also it is the goal that we Canadians must win to, if we have any trace of ambition and self respect.

THE PROVINCIAL GEOLOGICAL SURVEYS

The Provinces of our Dominion gradually are becoming equipped throughout with organized geological surveys. Ontario's department of Mines, now in its thirty-first year, has conducted geological investigations since its earliest years. At first the geologists retained for this work were borrowed for the summer season from the colleges. With the appointment of Dr. W. G. Miller as Provincial Geologist in 1902, a permanent geological staff was commenced that now has grown considerably. With the aid of those of the Department's staff whose duties are principally with the mines themselves, and with their members supplemented temporarily during the summer months, the geologists of Ontario now cover effectively the mining districts of the province. Their numbers could be increased materially with great benefit to the Province's mining industry; but meantime their aid is most effective, and is much appreciated.

In British Columbia, the local Department of Mines confines its activities to the aiding and regulating of actual works of prospecting, development and mining. Geological survey work is delegated to the federal Survey. The establishment of a local branch of the Geological Survey in British Columbia, with resident staff, and all but autonomous in its operation, has had virtually the same practical result as is attained in Ontario. Productive mineral areas are mapped in detail and their geological problems studied and solved, with the result that the miner has the advantage of whatever direction can be afforded him by geological science in opening up and following his ore bodies.

Alberta has now a well established geological survey through its activities are somewhat shrouded in mystery under the name of its executive body, the Scientific and Industrial Research Council of Alberta. What we would judge to be a systematic and [illegible]

commenced by officers of this department with the object of making immediately available the aid of geological science in the commercial development of the province's minerals.

The Government of Saskatchewan has shown as yet no intention of appointing a permanent geologist to its staff. Its mining industry is still embryonic, or rather, it is still in the germ stage. Still, it is more than likely that its growth would be stimulated, immediately and to a notable degree, were a competent geologist retained to enquire carefully into the resources available and to point out to prospective operators and investors the proper way of utilizing this potential wealth. There is plenty of precedent for expecting a successful result from such an appointment.

The recent mineral development in Northern Manitoba has resulted in a considerable amount of geological surveying on the part of the government in Winnipeg. There still remains to be effected, however, that formality of organization that will put this work on a basis of permanency and thus give its officers that opportunity for uninterrupted and consistent effort which alone will bring the best results.

Quebec was the first part of Canada to yield a treasure of minerals to the early settler, and still its mineral production ranks high among the provinces. But its early promise has not been fulfilled as yet. Perhaps as a result of this, or perhaps as one of the causes of this, the province has no geological survey. For many years geologists have been retained for a season's work; but this work has no permanency, and as far as one can see, leads to no definite goal. The potential value of Quebec's mineral industry is now, as always, very great. We are confident that the day of its realization would be materially hastened by the efforts of a competent geological staff whose exclusive concern was the development of Quebec's mineral riches.

New Brunswick is almost "terra incognita" to the miner. Areal surveys have determined sufficient of the stratigraphy and of the principal igneous intrusions to present a plausible appearance on the geological map. So little interest is shown in mineral possibilities by the resident population that there is little incentive for even that small share of attention due the province from the Geological Survey at Ottawa. We have had recently a pronouncement from the Director of that Survey as to some of the possibilities of New Brunswick as a mineral producer. This may help to stimulate an interest that has never yet been commensurate with the opportunity.

At one time Nova Scotia ranked as the most promising mineral area of its size in Canada. Today its mineral production consists of little other than coal. True, private initiative, principally transferred from the coal and iron-ore operations, is slowly becoming apparent here and there, but on the whole, the province is doing little to work out the salvation of its promising mineral areas. We need not repeat the suggestions made so recently in these columns.

Until the inhabitants of "The Island" succeed in proving either a coal seam or an oil pool beneath their fertile soil, their nearest approach to the subterranean excavations of the miner will be digging their famous potatoes. We do not believe that the supervision of these operations will require a large staff of geologists.

Throughout all the provinces, and supplementing and co-ordinating the work of all the provincial bureaux and surveys, are the Geological Survey and the Mines Branch at Ottawa. Their range of vision must cover the broad expanse from Atlantic to Pacific. Only they can study and work out Dominion-wide problems, and there are plenty of these to occupy the attention of their staffs. To the provinces must fall the task of solving provincial problems, particularly those directly concerned with the local mineral industry. To this end each province must, and will in time, provide a local geological staff commensurate with its needs.

RESULTS BY CO-OPERATION

Among the numerous interesting papers at the meeting last week in Montreal of the American Electro-chemical Society, none was more suggestive of live ideas or more fruitful of animated discussion than that of Mr. E. F. Collins on *Electric Heat: Its Generation, Propagation and Application to Industrial Processes.* After delineating briefly the scope and the means of applying electric heat industrially, Mr. Collins stressed the point that engineers skilled in the design and construction of electric heating devices have now such a firm grasp of the fundamental principle involved and of the practical requirements to be met that they can conduct their work with the utmost precision. This is a long advance from the electric furnace design and construction of even a very few years ago, when trial and error guided most of the effort, and when error followed trial much oftener than did success. The electric furnace is a comparatively new heating device, and it is highly satisfactory to know that the principles of its construction and operation have been mastered at so early a period in its career. This career is, we are confident, at present merely beginning, and will be, in Canada particularly, long and useful.

Mr. Collins' remarks on the present perfection of electric furnace design and control at once brought a rejoinder from a number of practical users of such furnaces. Their point was clearly put when it was remarked that their work in the plants required a dray horse, capable of long-continued and strenuous exertion, while they were furnished with a blood horse, sensitive, quick to learn, and capable of wonderful exhibitions, yet useless, for their purpose. This divergence between the man of science, even of applied science, working in a laboratory or under ideal conditions, and his fellow scientist in the commercial works, is typical and is a fruitful source not only of argument but of serious disagreement. Those that arranged this discussion in open meeting of the American Electrochemical Society, where good fellowship and mutual understanding are bound to prevail over the feelings that

would lead to serious disagreement and misunderstanding, have employed wisely the old-age British principle of free speech and open debate.

If there is one means more prominent than any other for promoting the modern spirit of co-operation in industry, it is the periodical meetings of technical societies. Their name is legion. No industry of any consequence now lacks this evidence of cohesion. Some people think there are too many societies; perhaps there are in some spheres of life. But in the realm of scientific and industrial endeavor, these societies are primarily a means of "getting together," and the more we get together, the better it is for us, individually and collectively.

One of the potent agencies in promoting this "get together" spirit in modern industry, particularly on this continent, is the growing proportion of college-trained men in the ranks of industry. With the ranks of pure science completely filled with men permeated with the fraternal spirit acquired in college, and with the forces of industry guided by an ever-increasing proportion of leaders trained in the same halls of learning, the old-style exclusiveness and secrecy that has hampered the progress of industry for so long is becoming rapidly a thing of the past.

Our own Canadian Institute of Mining and Metallurgy may well take a leaf out of the book of the American Electrochemical Society. We have, possibly, in the past been accustomed to proceedings that are principally of technical and academic interest, or that lead to controversy that is more interesting and amusing than of national importance or of prime interest to the mining industry, or that are disjointed and without the force resulting from concerted, constructive thought. Our industry, like our Dominion, is young and unformed, and is growing by leaps and bounds. There are many live questions that confront us. Let us search out the more important of these, and apply ourselves vigorously to their solution. A well organized symposium is one of the most effective means to this end. Our Institute has the power, if it will, of regulating and directing wisely and well the whole course of our mining industry.

THE SILVER DISCOVERY IN THE DISTRICT OF PATRICIA

When the phenomenal silver veins of Cobalt were disclosed, eighteen years ago, it was freely predicted that they would not prove unique, and that the broad expanse of similar rocks in Ontario and Quebec would be found to contain other such deposits. The occurrence of somewhat similar ore at Silver Islet in Lake Superior and on the mainland adjacent and of numerous other deposits of merely scientific interest in widely separated localities gave a good basis for this belief. Up to the present the promise has been fulfilled only in the case of the few operating properties of the Gowganda district, though "indications" of similar ore have been found in many places.

Still the search for a second Cobalt goes on. The latest reported discovery, at Red Lake, west of Lac Seul in the District of Patricia, north of Kenora, Ontario, may or may not be the long-sought prize. Though native silver is not reported as present in abundance in the veins, it is possible that the sulphides of lead and zinc, and the higher-grade ores of silver reported, may carry enough silver to make the narrow veins workable even in that distant locality.

A disturbing feature of the case is that a competent observer who has examined recently the veins so far discovered is not able to corroborate by any means all the statements that have been made about them by the prospectors. It is the easiest thing in the world to become over-enthusiastic about a new and promising "find". It is the judgment of a capable and disinterested observer that must be given most weight in such a case. We have had the conclusion of such an one and now must "wait and see", until more prospecting and development have been done and more of mother nature's secret disclosed.

EDITORIAL NOTE

Today we print, once again, an appeal for a more effective organization of scientific research throughout our Dominion. This might seem to be unnecessary, in view of the belief, now wide-spread, of the efficacy of research in stimulating and aiding profitable industrial enterprises, as well as in helping the prime producer, be he farmer, miner, lumberman or fisherman. The sad fact is that, though there is a vague idea of the value of research it is applied as yet in concrete instances to such a small extent that Canada tends to lag behind the rest of the world by reason of not seizing her opportunities promptly and with intelligence. Research is the intelligence service of the advancing army of industry, as well as its engineer corps to clear the roads and build bridges. We make no apology for harping constantly on our need for more, and better, facilities for research.

TO THE LUSTY LEGUME

I sing the Bean, the lowly, wholly Bean!
Not the emasculated legumine
One sees in cities on the pantry shelf,
But that whose virtue speaks for its own self.

O, Blessed Bean! How often have I ate
Whole plates of Thee, my hunger to abate!
And Thou abatedst it, Thou didst indeed,
Thou ever over-satisfying feed!

How oft have I devoured Thee, piping hot,
From out deep beds of ashes, in a pot
That had been buried there the live long night!
That, that's the way you taste exactly right

And I have had you bitter, bitter cold,
When boreal breezes blew o'er weald and wold
In fact, although your qualities are such,
I've had you, Bean, a trifle too darn much!

ANON.

Oil and Water

ARTESIAN WELLS AID IN LOCATING OIL "STRUCTURES" IN SOUTHERN ALBERTA

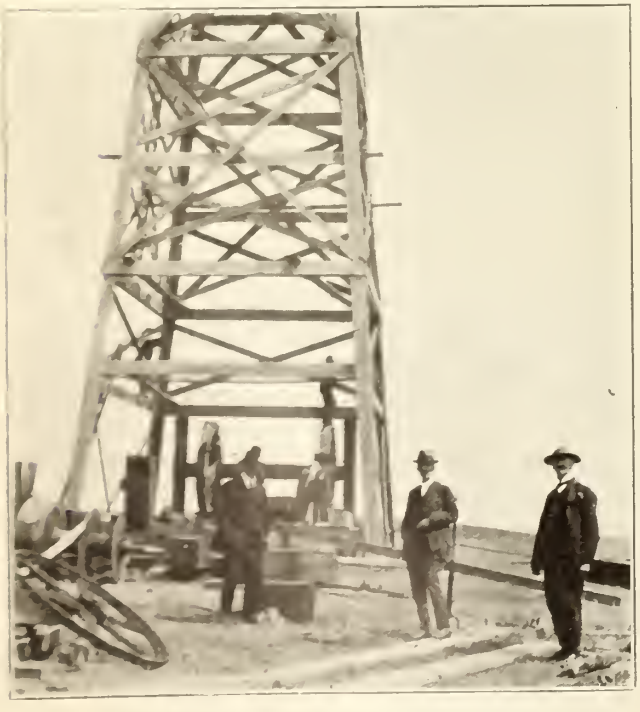
The field staff of our Geological Survey are the source of a vast amount of original information, useful particularly to those of the mineral industry, but likewise to the public at large. Seldom, though, does it fall to the lot of a geologist to perform a direct and indubitable public service of large monetary value, such as that done by Dr. D. B. Dowling recently for the farmers on two million acres southwest of Lethbridge, Alberta. That this service was purely incidental to Dr. Dowling's prime motive in examining the district makes it none the less notable; in fact it demonstrates once more the value of general scientific research, whether conducted in the field or in the laboratory.

Geological Reconnaissance

It was in 1915 that the oil boom, centred in Calgary, spread as far southward as the international boundary. In that year Dr. Dowling examined on behalf of the Geological Survey the area south and southeast of Lethbridge, with a view to possible oil production. The principal data required for such a purpose are the age and character of the rock strata within reach of the welldriller's tools, and "structures" such as might collect and confine the minute particles of oil, moving slowly through a porous stratum, in "pools" of commercial importance.

During this stratigraphic study, Dr. Dowling determined that a stratum of soft, porous sandstone that outcropped in the valley of Mill river, just north of the international boundary, dipped at a low angle beneath the plain to the north, reaching a depth of 600 to 900 feet as it approached the railway, 60 miles northward. The prairie in this part is devoid of streams or lakes that could be used for a domestic supply of water, and the rainfall during the summer season is so uncertain that it cannot be depended upon to fill reservoirs. All attempts to get water by means of ordinary wells had failed, and the settlers of the area had a very precarious existence.

THE INTAKE — Remnants of Bed of Soft, Porous Sandstone in the Valley of Milk River



The McLean Outfit Under Construction

The First Artesian Wells

The geological reconnaissance did not mark the commencement of an oil boom in the district; but it did provide water. Dr. Dowling reported officially to the Geological Survey that artesian wells would, in all probability, be found if bore-holes were put down to the Milk-river sandstone, a distance of 600 to 900 feet below the surface of the prairie throughout an area of a million acres, which he delineated. Some unbelievers in Lethbridge publicly derided this prediction, classing it almost with the notorious hazel switch divination of water "doctors". Then came a pretty little show-down. Our geologist undertook to find the water if his detractors would assure the goverment of the need for water and the importances of demonstrating by actual drilling the soundness of his theoretical deductions. Money was voted forthwith, and as quickly as holes could be bored, three first-class artesian wells, at widely separated points within the million acres specified, were providing the lifegiving fluid as predicted.

The Present Oil Boom

So much for the water. Now we shall return to oil. The next boom was staged in Montana, south of the artesian area. A year ago the Campbell well near Kevin, a wild-cat, found at 1770 feet depth. Mr. Campbell was such an effective promoter that the excitement waxed and a number of other wild-cats were

put down. The first of the lot proved to be a gas well but in June, another, only eight miles from the Campbell well, really found oil. Since then five good wells have been found, within ten miles of the international boundary. This is such recent history that the sequence of events is still in mind.

At present there are a number of new wells being put down on the Montana side. Some are likely to bring gas only, as they are near the top of the dome that is providing oil for the producing wells. On the Canadian side, excitement grows apace. At present there are eight outfits drilling near the boundary, as follows:
Livingston-Mc Lean—Section 1, township 1, range XV
Somerville—Section 2, township 1, range XV
Baalim—Section 2, township 1, range XV
Mc Lean—Section 10, township 1, range XV
Bow Island—Section 15, township 1, range XV
Philips—Section 24 township 1, range XV
Imperial Oil—Section 5, township 1, range XVI
Border Oil Co.—section 6, township 1, range XV

All these wells are on an anticline dipping gently northward from near Kevin, where its top is. This anticlinal area underlies the Sweet Grass Hills of Montana, just south of the border. To the east of this are East Butte and West Butte, igneous intrusions that appear on the surface as conical mountains. A well put down just north of the West Butte in 1911 brought in "vaseline"—it was too close to the intrusive rock for oil. An American company is now preparing to test the ground north of East Butte, which is adjacent to the border south of Lake Pakowki. However, it is considered at present that the main chance for oil is in the principal anticline, stretching northward from Kevin in Montana toward Taber, on the Canadian Pacific Railway in Alberta.

Artesian Wells And The Geologist

In order to study in some detail the geology of this anticlinal are, Dr. Dowling had recourse to the artesian wells. He travelled the artesian area systematically, and located 115 wells. From the farmers and from the records of the well drillers he obtained the depth at which water had been struck. This marked, of course, the depth at 115 points of the water-bearing Milk River sandstone. The elevation of these wells was determined by reference to bench marks in the township surveys, and thus the contour of the strata, hundreds of feet underground and invisible at the surface, was worked out. Of course the data obtainable from these drill holes is fragmentary, and some of the conclusions are merely tentative. Still, there have been determined within the area of the major anticline a number of minor "structures" favourable to the accumulation of oil, and the work of exploration for oil can now be conducted wth considerably more precision then heretofore. The more promising locations delineated are all within this anticlinal area. The Lake Pakowki area, where some work of exploration is in progress, is on the flank of this anticline and its chances for production are less. A deep well drilled just west of the lake showed only tar sand,—a mere residuum of the oil that filled the porous rock before its migration.

Thus we have a complete demonstration of the utility of the man of science, even of pure science, to the workaday world. The geologist in this instance predicted a great extension of the gas field and nearly hinted the possibility of oil; but he demonstrated the feasibility of providing water for the homes, the cattle and the gardens over an area of two millions acres. Without these artesian wells, those acres would revert again to open pasture land. The drilling of the wells has provided our man of science with a further opportunity for forwarding the interests of the district. He is not able to predict the future of oil production so positively as he was able to do in the case of the artesian wells. If the hoped-for flow of oil from the deep strata beneath should be even the merest fraction of the present flow of water from the Milk River sandstone, then Canada will have taken a long step forward in the direction of adequate domestic oil production.

THE OUTFLOW — Artesian Well, 35 miles North of Milk River, Tapping the Same Bed of Sandstone

THE OVERFLOW — Artesian Well, Irrigating a Garden in the Dry Belt

CORRECTION

On page 621 of the issue of Sept. 15th, there is an obvious mis-print that makes confusing one of the tables demonstrating the Hollinger record of production. The first line of the table, *Hollinger July August Figures*, is repeated in the succeeding table *The Year to August 12*. In the latter table the figure of *tons milled* is actually 904,882.

Research in Canada

MORE SYSTEMATIC AND MORE INTENSIVE RESEARCH WORK NEEDED

by GARNETT W. RICHARDSON

"Original Research is in itself the most powerful weapon that ever has been or ever can be wielded by mankind, in struggling with the great problems which Nature offers on all sides for solution".

Prof. Meldola

During the latter part of the late war, and since that time, the part that scientific research and discovery have played in the intense international industrial competition has had a marked effect in helping to bring prosperity again to the world. European countries have probably been foremost in this research seconded possibly by the United States. Sad to relate Canada has been somewhat backward in her research activities.

Research Officially Recognized in Canada

In 1916, by Order-in-Council, the Government of Canada established an Honorary Advisory Council for Scientific and Industrial Research. The Council was authorized to make an investigation into the various agencies conducting research in the universities, and especially, to quote from the Order-inCouncil, "to become acquainted with the problems of a technical and scientific nature that are met with by our productive and industrial intersts, and to bring them into contact with the proper research agencies for solving these problems, and thus link up the resources of science with the labour and capital employed in production, so as to bring about the best possible economic results".

When the Council commenced their investigations, they found "that scientific research in Canada was practically confined to the laboratories of two or three of our universities, and one or two departments of the Government." They also found the absence of any scientific control in the industries. Consequently the waste in our industries was tremendous, and we can easily understand the difficult task that confronted the Council. However they succeeded in directing attention to the value of scientific research by lectures, bulletins, and addresses.

A series of studentships and fellowships was established to encourage university graduates to enter the field of research, and substantial assistance was given to research, both academic and industrial. The relationship between science and industry was fully recognized by the Council, and they set about to bring "an intimate co-operation between those who could set the industrial problems, and those whose knowledge and training would aid in their solution."

In 1917 it was proposed that a Central Research Institute be established at Ottawa, to develop both scientific and industrial research in Canada. A Bill to this effect was brought before the House of Commons, and was carried almost unanimously. However, the Bill was turned down by the Senate on the grounds of economy, and has not as yet been re-introduced. As a matter of fact, though, a small grant has been given each year since that time by the Government to enable the Council to carry on a limited amount of work. It may be stated without prejudice to the Government, that every moment lost in inaugurating an adequate Research Institute means a tremendous loss in our industries, and the falling behind of our country in the ever-increasing international industrial competition. The Administrative chairman of Advisory Research Council in his report for the year ending March 31, 1920, states that "the urgency of the establishment of this Institute is of the first order of importance, and every year lost in effecting this establishment will increase the difficulties which Canadian industry will face in competition with industry abroad, aided by all the resources that scientific research will place at its command."

To Hamper Research is False Economy

Economy is no argument against the establishment of a Canadian Research Institute. Anyone using this argument shows lack of information on the real value of research. A few results of scientific research in some other countries may be given here appropriately. In the United States at the Mellon Institute in Pittsburg, a few years ago a research into improved methods of bread making was undertaken, at the instance of an association of bakers. With the expenditure of some $5,000, certain discoveries were made almost immediately that enabled the bakers to affect a saving of $500,000 annually. Needles to say, the bakers paid the investigator a very generous bonus. A few other cases relating to the financial returns from research in the United States may be cited. In one case an industry, founded with a capital of $25,000, had accumulated $200,000 of assets at the end of two years, and was doing a busines of $1,000,000 annually. In another case an industry started in a small way was making a monthly profit of $50,000 at the end of eighteen months, during the first six months of which the business was in the experimental stage. It has been stated authoritatively that over fifty industrial concerns in the United states have established research laboratories on an extensive scale and many of these expend from $100,000 to $300,000 on research work alone. The most prominent Government research agency in the United States is the Bureau of Standards, at Washington, D. C. This establishment employs about three hundred scientific workers, and handles the greatest diversity of problems. It tests and conducts original researches on papers, textiles, structural and other steels, building and roofing materials, cements, paints, inks, chronometers, thermometers, barometers, electrical apparatus of all sorts, radio-active preparations, and in fact anything and everything to which a mechanical, physical, or chemical test can be applied.

Official Aid to Research in Britain and Elsewhere

In England, during the course of the war, a State Department of Scientific and Industrial Research was organized, and a fund of a million pounds was placed at the disposal of the Department of research work. One of the foremost activities of this Department has been in getting together manufacturers in the same industry for the founding of research laboratories on a co-operative basis. In connection with the mining industry, studies have been made of the carbonization of coal, light alloys, refractories, concrete, the corrosion of non-ferrous metals, insulating oils, and many other such problems. Great economies have been effected in the recovery of tin from the mines in Cornwall. Porcelains imported in considerable quantity from Germany before the war have been replaced by very satisfactory substi-

tutes made from British elays. Also, for the furtherance of research in the mining industry the British Non-Ferrous Metals Research Association has been formed and is doing very valuable work.

An instance in England of the value of authoritative scientific counsel in its relation to industry may be instanced. One of the largest steel corporations in England had, until 1914, been importing from Austria through a German agency, a certain material for lining its converters. When war was declared they had a two years' supply on hand. As time wore on and the supply diminished, the directors were obliged to call for scientific advice. They were referred to the geologists, who informed them that a bountiful supply of the material in question was available in the immediate vicinity of their plant. This information was acted on, with the result that the company is now mining in sufficient quatity on its own account the material formerly imported from Austria at many times the present cost.

France has kept pace with other countries, and has an Academy of Science to her credit. In Japan an Institute for Physical and Chemical Research has been established, at a cost of over two million dollars, this expenditure being shared equally by the Government and the manufacturers. These are only a few instances of the research work being done in other countries; innumerable other instances might be given. It is apparent that if Canada is even to keep her present status in the present international industrial competition, greater attention must be given to the fostering of scientific institutions. It should be the duty of the Government to grant a liberal sum for the establishment of research laboratories, and for their maintenance for a limited period of time, until the industries concerned could take them over. Then the prosecution of industrial research on a co-operative basis could be delegated to the intersts themselves, an association of manufacturers in each branch operating the laboratories for the common benefit.

What is Research?

Occasionally we find persons having only a vague idea of which "research" really means. The right Hon. Lord Moulton, K. C. B., F. R. S., in his introduction to the volume published by the Cambridge Press entitled "Science and the Nation", says, "the word 'research' has of late years been used too frequently as little more than a cant phrase, dear to educationalists, but carrying with it no clear or definite meaning, and if there is any patent or latent hostility to research it is mainly due to the way in which the word has thus been treated by its self styled champions. But (as I am glad to say is frequently the case even in the arena of legal conflicts) the blunders of the advocate have not been sufficient to hide the merits of the case. Not only thoughtful educated men but even numbers of the general public are beginning to realise that it is to research in its proper signification that we owe the knowledge of the wealth of the world in which we are placed —of the power that is within our grasp. The man engaged in research is like the mining prospector who may discover that rocks, which seem to the ordinary eye indistinguishable from the barren masses that surround them, are in reality teeming with riches. But for research one would never have known that the coal tar oils which resemble so closely in their general characteristics the Paraffins or Petroleums are capable of entering into combinations of such novelty and complexity that they now furnish the whole world with dyes and chemical products of priceless value. It is the application of research to the problems of metallurgy that has caused the additions to our knowledge of metals during the last 50 years to be greater than all that has been learnt in the ages that had elapsed since man first began to work metals. And what is most remarkable of all, we find that through the introduction of research the empirical handling of the problems of organic life is being step by step replaced by an assured treatment based on a conscious and realised connection between cause and effect. All these changes are due to Research. Scientific research has removed our previous ignorance of the properties and powers of the things around us and has taught us what they are and how they can be used. It is not too strong a simile to say that without the teaching of Science man blunders through life much as a card player would blunder through a game of cards if the did not take the trouble to look at the cards in his hand and learn their value."

Canada's Opportunity

The opportunities for research in the mining industry—probably the largest of all the world's industries—appear unlimited. In Canada we have the mineral resources and the young industries, and the right type of young men to make a vocation of research work. I am not overlooking the older men, the trained scientists of to-day. No doubt we have in Canada at the present time as able scientists as there are in any other country in the world; but we must look to the young men to take their place and advance the field of Science. It may be safely said, that any young man entering the field of Science will be entering a field full of the finest fruits of nature.

We have the material in Canada, and if this fair Dominion is going to keep pace with other countries, we must have a strong, intelligent Government lead in the field of Scientific and industrial research, and hearty co-operation among our industries for the furtherance of the interests of each and all.

I.-R. GENERAL CATALOGUE

The Canadian Ingersoll-Rand Company have just issued a new condensed General Products catalogue. This is an unusually attractive volume of 230 pages, fully illustrated, composed of fifteen sections with thumb index, bound in loose-leaf style. As a general volume of reference for the Company's numerous products, this should prove very useful to Canadian mine managers and others interested in equipping mining properties, to whom it will be sent upon request. The fifteen sections are as follows:

Compressors and Accessories
Air, Steam and Electric Hoists
Vaccum Pumps
Condensers
Oil and Steam Engines
Steam and Centrifugal Pumps
Air Lift Pumps
Rock Drills and Accessories
Drill Sharpeners and Accessories
Rock Crushers
Pneumatic Tools
Tie Tampers and Accessories
Pulp and Paper Machinery
Rubber Machinery
Engineering Data

The last section gives tables and charts dealing particularly with air compression.

Review of Progress in the Conditions of Coal Mining

By JOHN MOFFATT

Initiative brings Progress and Safety

When in the year 1815 Humphrey Davy discovered the principle of cooling a flame that led to the invention of the safety lamp, a great step forward was taken in coal mining. Ever since then mining men have been slowly toiling upwards, and today we can look down from heights we have reached, and are able to trace distinctly every step taken on the rugged ascent. For progress has been slow and painful at times, and the whole price has not yet been paid. The too frequent news flashed across the world of mine explosions, mine fires, and sometimes mine floods, are stubborn witnesses that we are still far from the goal where we can pause and rest for a while with the peaceful assurance that we have reached the top of the hill. But unhindered by obstacles and undismayed by disaster, the eyes of mining men have been steadily fixed on the prize that comes to those that press forward manfully. So they have travelled far on the way to success. Much has been accomplished, but much more remains to be done. Real progress began with the safety lamp. With the means of getting to know mine gas, (CH_4), its nature and its habits, miners began to study it and to try to cope with it. It is stated that previous to 1815 mining in gaseous districts was much retarded and many collieries, because of gas and other difficulties, were considered unworkable. But it was only man's initiative that was for the moment arrested, and when the "Davy," the safety lamp, was invented, man's inventive genius received an impetus that has carried him forward with an ever increasing momentum, and if today the very gaseous mines of Belgium and other countries can be safely operated under cover of over 4,000 feet, it is because mining science has made the most of its discoveries and kept steadily marching on. Progress has been made all along the line in the methods of working in mine gases, in ventilation, timbering, and pumping, in transportation, and in cleaning and assorting coal for the market.

The safety lamp has been much improved and almost perfected as a gas detector since its first appearance. Miners thoroughly understand it and value it, and it is the use of the safety lamp that has made mining in a gaseous atmosphere possible. For every day work, lamps of a strong make are used, but for the work of examination of mine gas (CH_4), some well known, standardised lamp is selected and placed in the hands of the expert miners. For the minute examination of the mine atmosphere, by mine examiners, lamps specially designed for the purpose are used. In addition, samples of the mine air are taken in air-tight vessels and where there is any suspicion that the atmosphere of any mine is approaching the danger state through mixture with mine gas, an analysis is made daily.

Knowledge means Safety

The many regulations that came in with the use of the safety lamp have all had a disciplinary effect and tend to make miners more careful. The testing of the lamp by the foreman of the lamp house and then by the miner himself, its further testing underground at the lamp station by the examiner, who gives the miner his report, the locked lamp, and the relighting stations, with their powerful magnetic unlockers placed at special places in the mine, the exclusion of tobacco, pipes and matches from the mine where these lamps are used, are in themselves eloquent every-day reminders that the utmost care must be exercised in a safety lamp colliery. It is a long step from the time when the miner set fire to mine gas in his place as the quickest way of getting rid of it, or brushed it out with his coat only to have it return, up to the present, when with a closed instead of an open light, he is not permitted to go near his place until he gets a clear report from the examiner. These and other dangerous practices of the past are well within the memory of many miners today. The dropping of them marks certain stages in the progress of mining; but these early practice cost many lives and left many maimed and disfigured miners. Progress exacts payment in the highest values, and this step forward exacted its full toll.

The electric light is rapidly taking the place of the flame safety lamp, but it cannot be used to detect mine gas.

Inauguration of Ventilation

The nature of the different gases met in the mine having become well known, mine ventilation was improved to meet conditions, and no mine of any size and depth is found today without some well defined system of ventilation. In early days a furnace usually was placed at the bottom of the return air shaft, with the return air passing directly over the fire; or, if the air was supposed to be heavily charged with methane (CH_4), then a "dumb" drift driven to a higher point in the shaft and the steam jet were used among the first aids to natural ventilation.

As the mines went to greater depths, fans were used. One type followed another until today we have powerful machines forcing or pumping air out of or into our collieries in any volume desired. As a further aid in the long airways, booster fans are being used to supplement and to lighten the load of the surface fan, and in case of breakdown there is at most collieries an auxiliary fan ready to start up at once.

A sufficient quantity of air to keep the mine clear and the miner healthy is specified by law in most mining countries. The condition of the air entering and leaving the mine is constantly registered. Instruments for measuring its velocity, humidity and temperature are all part of the mine manager's equipment. If the air in the mine is too dry, it must be moistened. Various processes such as the spray and the steam jet on the intake are used. If too hot, it must be cooled. This condition is seldom met with in the northern part of this continent with our comparatively shallow mines and equitable climate; but in Brazil and other warm countries, cooling plants, to cool the mine atmosphere and reduce the temperature of the strata and keep the workmen energetic and alert and less liable to accident, have been constructed at great cost.

Controlling the Mine Atmosphere

In all large colliery districts ventilation is usually under the direct supervision of a mining engineer, who confers with the manager in charge. This greatly helps the manager and usually gives satisfactory results in the matter of ventilation. So again, looking back to the days when, using natural ventilation a charge of wind set us to or stopped us from working, or while at work we suffered all the ill effects of an impure atmosphere,—comparing this with present day conditions, we can gauge the progress made.

Good ventilation implies ample airways, well planned and constructed, and whatever system is chosen, whether

it be the ascensional or any other, nothing is left to chance. A well conducted colliery must have its main and its secondary airways with their various stoppings built as necessity dictates, and whether there are overcasts and mine doors or some other device, the system must be simple and suited to the conditions of the mine.

If the mine is dusty and dry, the dust is loaded out and the section watered, or a wet or stone dust zone created, heavy stone dust being used to cover up the coal dust, or water applied in quantity to produce super-saturation. Such methods were unthought of a few years ago, although they were just as necessary then as now.

Safe Explosives

As the blasting of coal loads the air currents of the mine with smoke fumes and with coal dust, and in this way is often the cause of mine fires and explosions, great changes in the use and the composition of the explosives used have been brought about. The use of black blasting powder is no longer thought of. Though the ideal explosive for breaking down coal with the least shattering effect, it flames invariably when exploded and is now considered unsafe and in most places is debarred from the coal mine. Permissible explosives have taken its place, with greater safety to the mine and miners, although with more breakage to the coal. This latter result has, however, been offset by the advanced knowledge of the use of fine coal. If it could be sold on the B. T. U. plan, sizing would almost be eliminated. The principal factor, safety, has been extended, and as far as possible blasting in a coal mine has been rendered safe.

Economical Mining Methods

It is not long since investigations were carried on in the United States to ascertain the percentages of coal won and lost in coal mining. The information gathered was most startling and showed that little over half was taken from some coalfields. It was found that many of the methods of mining were faulty or that in the desire for cheap coal the methods employed were not followed as planned. Immediate steps were taken to correct this cause of loss, and methods of mining all over the continent came under the searchlight. The Canadian mining industry profited by the investigation and loss in mining coal was much reduced. Methods in vogue were scrutinized and improved. Some, owing to greater depth and pressure, were changed. There is no doubt that in the methods of mining the skill of the mining engineer is most tested and he becomes a success or a failure just as he is able to improve or change the method to meet the changing conditions of the mine. A colliery that for years has been a success under the bord and pillar system may, under thick cover and greater pressure, be forced to modify its system or change to some other system. Long wall retreating, may in practice prove to be a failure, while advancing it may be a success. The panel system, because of spontaneous combustion or other causes, may be the only available system for other seams. Collieries reaching great depths usually have either to modify or change their methods of mining.

Failure to follow out faithfully the method employed is usually just as disastrous to coal winning as it is to refuse to change to another and more suitable system when every indication points that way. Squeezes, creeps, bumps, etc., are nature's ways of protesting; but the alert mining engineer usually avoids these costly errors and plans to extract his coal with the least possible disturbance. Conditions will and do arise over which the engineer has no control, however, well adapted his plans. Mining scientists in different countries are slowly coming to the conclusion that many of the "bumps" in a coal mine are due to earth movements and cannot be avoided. Nevertheless we do know that faulty methods often have been the cause of very serious bumps, but the great amount of knowledge that has accumulated by research and experience and the interchange of ideas has led us to a better understanding, and we are beginning to learn that there is more motion in our earth than we usually think of. Whether with our advanced knowledge we will be able to plan against seismatic tremors as some of the builders have undertaken to do in cities visited by earthquakes, we do not know; but to be able even to discern the cause of certain mine disturbances is a step forward and leads on to the next step. The fact that the Nova Scotia coal operators have brought in for consultation expert mining men from Great Britain and our Western mining Provinces, as well as from the United States, is in itself a proof of progress, in that we have learned to seek knowledge where we know it is to be found.

Underground Transportation

It was a long step forward from the pushing of pit boxes by man-power, to the pit pony. None of these have, however, been altogether displaced. The work of each has merely been lessened to the extent that the use of rope, compressed air, and electric motor haulage have been adaptable to the various haulage problems. Both men and horses are yet the feeders of many of the different mine haulage systems. This is especially true of low seams. The extended use of mine haulage has made possible the enormous daily outputs common to the more favored collieries. In looking back over a period of fifty years, I am inclined to think that the gravity system of haulage was just as thoroughly understood then, and more utilized than it is today. Some new form of motive power is in common use today where formerly the jug wheel on the gravity incline was the only practical means of lifting and lowering raikes of boxes.

The tracks and roadways of the present time are improved beyond all comparison with other things. From planks laid on edge, to the flat one-sided rail, and from that to the flat rail, placed on its edge on notched wooden ties, we have progressed to the common T rail of all weights. With these came improvement in the design of the mine-car axle and the wheels. Thus transportation has forged ahead.

The Mine Water Problem

Mine water is a problem that has stubbornly resisted solution. The acidity of the water and its effect on pump valves and pipes has constituted the more serious part of the problem. Efforts to overcome the bad effects of mine water on parts of machinery have taxed the ingenuity of the engineer. Some have tried to change the water in the mine by the use of alkaline salts, while others have sought to discover metals or alloys that will withstand the corrosion of the water. Among these acid resisting materials are duriron, stainless steel, aterite, porcelain, glass and compressed rubber. While all of these have been found good, yet they are far from perfect in use.

Pumping stations, to which all mine water is conducted in drains, and the use of the electric pump have simplified pumping. The diamond drill has come to its assistance by boring from the surface directly over mine lodgements, thus cutting off long pipe lines through the entries and reducing losses of power due to friction.

Timbering

Timbering has become a fine art, and in all well regulated collieries the system of timbering is standardized. How it shall be placed, the distance apart, the kind of timber to be used, are all a part of the mine rules. Exper-

iments tending to discover just how long mine timber will last after treatment by salt, creosote or other solutions have advanced mining knowledge. The use of steel supports is in many cases displacing timber, which marks another stage in progress.

The increased use of mining and boring machines has greatly helped to expand the coal industry and to allow of large outputs with a minimum number of men. The saving to a coal company that has to provide houses for its workmen is large. Development is more rapid and larger outputs per pit are obtained. When the mechanical loader becomes a success, one of the hardest problems in mining will have been mastered. The hammer drill has made shaft sinking and rock tunnelling comparatively easy.

The Miner Himself

There remains the "welfare" side, which while it may not be looked upon as part of the science, is nevertheless most essential to success in mining. The relief societies, compensation board, the housing conditions, the bath houses at the collieries, the employees' trains, and mine riding raikes, the first-aid station and the rescue corps are all milestones marking the onward way. They could now be no more dispensed with in the life of the miner than the use of safe explosives in breaking down coal.

THREE GENERATIONS IN THE MANUFACTURE OF MINING MACHINERY

On the front cover page of this issue will be found the announcement by Chalmers & Williams, Inc., Chicago Heights, Illinois, of the fact that they have made arrangements to manufacture their well known line of mining machinery including Symons disc crushers, with the John Inglis & Co., Limited, Toronto, Canada. While this action marks a forward step for Chalmers & Williams, it works an even greater advance in Canadian industrial affairs. By their affiliation, the John Inglis Co. are now able to offer a complete line of crushing and grinding machinery for mines and quarries, manufactured in Canada but proved by years of experience.

The original Company was established in 1849 by Mr. Thomas Chalmers, Sr., and in 1861 became known as the Eagle Works Manufacturing Co. and was incorporated in the State of Illinois. It was re-organized in 1870 and became known as the Liberty Iron Works, and subsequently was known under the name of Fraser & Chalmers. Under this organization, Mr. Thomas Chalmers, Sr. was in charge of shop management and factory output and with Mr. Fraser, both of them skilled mechanics, the Company prospered.

The force of men employed in 1872 was sixty men and under the guidance of Mr. Chalmers and his son, Mr. W. J. Chalmers, who took active charge of the business on the retirement of Norman B. Fraser, the business grew until in 1900 they employed a working force of 1800 men. Their machinery was known throughout the world, and it was as common an occurrence to ship machinery to Africa, India, China, Japan, Australia or South America, as it was to ship to Colorado or California. The equipment produced by this Company came to be known as the highest grade of mining machinery manufactured and very few important mines came into existence that had not at least some part of their machinery manufactured by this Company.

In 1905, on the retirement of Mr. W. J. Chalmers from active interest in the manufacture of mining machinery, the co-partnership of Chalmers & Williams was organized, composed of the son of Mr. W. J. Chalmers, Mr. Thomas Chalmers and Norman Williams, the son-inlaw of Mr. W. J. Chalmers. This co-paternship was subsequently incorporated in 1908. This Company started out in the manufacture of the same class and grade of mining machinery formerly manufactured by the parent company and some years ago took over the manufacturing rights of the Symons vertical and horizontal disc crushers. They, like the parent company, are making their product known throughout the world.

Thus it will be seen that there generations of the Chalmers' family have been engaged in the manufacture of mining machinery since 1849. The manufacture of their line of mining machinery in Canada will enable them to serve better their customers in the Dominion.

COAL SUPPLY

The United States Geological Survey reports that normal production at the anthracite mines during the present week (September 18-23) has brought the total output of all coal, anthracite and bituminous, up to about 11,650,000 net tons. This is still somewhat below the amount required to meet current consumption and Lake shipments and at the same time to rebuild consumers' stocks.

The total output of anthracite during the first week after the strike was 1,064,000 net tons and during the present week (the second following the strike) it was about 1,850,000 net tons. The cumulative production to September 16 this year is 23,325,000 tons; with an estimated production of 1,850,000 tons this week the total output to date is approximately 25,175,000 tons as against 67,759,000 tons in 1921. The present year is therefore about 42,584,000 tons behind last year.

Production of bituminous coal in the present week is estimated at from 9,600,000 to 9,900,000 tons, a slight increase over the week preceding. The present output is above that of the corresponding period of the year of depression, 1921, but is below that of the other years shown.

The present condition of the coal market resembles the three years 1918 to 1920, more than 1921. In those three years, as now demand for soft coal was active enough to absorb all the coal that could be transported.

Hans Renold of Canada Limited, 11 St. Sacrement Street, Montreal, advise that their parent company have been successful in securing the contract for all the Chain Drives in connection with the South African Government scheme for handling, storage and shipment of South African grain. In addition to the terminal elevators at Capetown and Durban, this order includes thirty-four Country Station Elevators which will be built by Messrs. A. W. Menkins Company of New York City. This contract totals 272 Renold Silent and Bush Roller Chain Drives, which is said to be one of the largest, if not the largest single contracts ever given for Power Transmission Chain Drives in grain elevators.

The Department of the Interior, Ottawa, estimate that the 2,700,000 h.p. of hydro-electric energy developed in Canada saves us 27,000,000 tons of coal annually. Of course, its chief use is as energy, not as heat, though in special case it can be used economically for heating purposes.

News and Comments

By ALEXANDER GRAY

The "Secret" is out

In a stage whisper the firm of Minyard & Company, of Toronto, is circularizing the populace about "one of the Ontario gold stocks", of which it professes to be reliably informed, to this effect:

> "The property in question has long been believed to possess ore reserves equal to ten years' requirements. Recent explorations, *secretly* conducted, have developed at least five times the previously estimated ore reserves. In addition these explorations have uncovered veins of such *tremendous* richness as to be *almost unbelievable*."

Minyard & Company said it. "Almost unbelievable" expresses it to a nicety. It is consoling to have the "secret" imparted in this public manner—in an Irishman's whisper, as it were. Somehow, fifty years' requirements rather accentuate the "unbelievable" element in the "come on" circular. However, as Minyard & Company are "anticipating" an "early reply", there it is. Minyard & Company are.

Will They Get Together?

Success at the Lake Shore and Wright Hargreaves, and the advent of large interests at Kirkland Lake, may bring about at least one amalgamation that might not be amiss. The subject is a delicate one; for the Lake Shore and the Wright-Hargreaves have been the mainstay of the Kirkland Fields while other producers rounded to. Being so intimately related and having their areas in an excellent stage of development, if the principals should decide to join hands and go in for a greater milling program Kirkland Lake should be benefitted. A year ago Kirkland Lake Proprietary interests were understood to be casting longing eyes at the ground acquired by Continental Mines and the Nipissing Company. Options were under negotiation. But "the bones" were not rolling right in London, so Continental and Nipissing absorbed the country. Kirkland Lake consolidations, if sanely arranged, could be made very helpful. Will Al. Wende and Harry Oakes divide the pot?

Rather Purblind View of Mining

As he arose to leave the street car, compressing his lips, the somewhat taciturn ex-President of a Canadian Stock Exchange truculently remarked "Well, so far as I'm concerned, I never owned a share of mining stock. I think one mine in ten thousand may be a good one."

He is a conservator of credit—a shrewd seller—has entrenched himself against the allurements of shares in mining ventures—keeps the pledge that he will refrain from personal participation in any of them no matter what his clients do at their own risk. Mining! Perish the thought! Better, a thousand times better, to take the quarter and an eighth commission on listed and unlisted stocks.

The speaker is obsessed with the nitwit notion that all Mining should be taboo, to all but the sulphate of calcium minded. He is prominent dealer in what has ruefully been described as the "unbeatable game". Respected by his fellows for "holding them close to his chest" and keeping the other players from knowing what he has in his hand, his acumen hardly exculpates him from what amounts to an offense against that industrialism without which his avocation would be less profitable. He regards his aloofness as a redeeming trait, whereas it is such as he who should co-operate in the intelligent exploitation of those natural resources which are the basis of permanent investments.

Declining to be educated, lacking sporting spirit, possessing irremovable prejudices against vital economic factors, his convictions have nothing but back action that gets us nowhere. It is this attitude on the part of self-centered, sapient mediums of investment and speculation, that leaves bona fide prospects and meritorious mines to the too frequently unmerciful manipulators of the telephone "ticker" miners—jugglers of the tape. Like the ornamental citizen who will not go to the polls to vote because he has no choice of parties or candidates, he withholds his influence from what would preclude a great deal of the deviltry he misconstrues as mining. So he would make mining an infringement upon the prerogatives of stock exchanges, and leave all who think otherwise to take the consequences. Of such are the Kingdom of Hip-pocket Holiness, who really believe they are conserving sumptuary sanctity.

After all, it is not the "tight-wads" who matter, however salutary may be their example. Their precepts are distorted. Mining has enriched the sciences and the spheres. Without mining whole States and Provinces would be so many prairie dogs' Paradises; other regions would not be so remarkable for the varieties of cacti and the coyote. Railheads would not be so numerous. More "terra incognita" would be shown upon the maps, real estate "miners" would be unemployed. When all the so-called granger and trans-prairie railways were built, they "came up for air" in the mining highlands of the Far West, long before California, Oregon, Washington and British Columbia became notable for their soil and climatic effects. "The Golden State" had precedence in the whole of the development of the Western United States.

Admitting it was the gold of California that put the Pacific section "on the map," we do not deny it was the San Francisco Stock Exchange that brought tragedies to the Bank of California, and others. It was not the mines or the placers that drove men to distraction. Without Sacramento, Grass Valley, the Motherlode and the Comstock, engineers in mining would be among the casuals or casualties; the production of wealth would not have given impetus to diversified enterprise in and out of trade marts. Granting individual judgment will err, that cupidity and crookedness have beclouded the benefits derived and derivable from mining industrialism, this cannot imply that the gains on balance are not greater than the losses.

To illustrate this: The other day there was laid away a towering personality, a patriarch in his profession; very prosaic, but the most romantic, melo-dramatic actor on the modern mining stage. His mistakes were on the side of conservatism—another phase of what the ex-president of the Stock Exchange manifested. Sent by his principals (who had reason to impose implicit confidence in his professional opinion, and were willing to abide by what he thought); he wrote of the discoveries of banket at the 'Rand:

"It is not worth coming off your horse to look at."

According to all precedents this representative of Cecil Rhodes and others was perfectly right. The emphatic decision of that "prenez garde" exponent kept Rhodes and his colleagues away from the 'Rand, for a while, although

Hamilton Smith was favorably impressed. Ordinarily the big mistake of the biggest of men in his profession, would have excommunicated him. But he simply had voiced his sense of duty to his principals; what he considered a freakish occurrence was not good enough. Shortly before he had condemned the Barberton Gold Fields of the Eastern Transvaal, and brought down upon himself the execration of all concerned. He was as right in this respect as he was wrong at the Rand. A quarter of a century later, he was retiring from his unique position at the Kimberley Diamond Fields. When he hesitated about commending his capable son as his successor, Rhodes, with that characteristically democratic spirit for which he was noted, replied

"What in earth does it matter if he is your son?"

This man was the confidant of Rhodes, Wernher, Beit, Smith, Rothschild, Carl Meyer and Barnato; yet he flouted the greatest of gold fields and coincided in the rejection of the Premier Diamond Mine, the largest of its kind ever discovered. He was a scientific investor — strictly so.

So, why charge it against mining and mining men, that they proffer unnecessary risks! Essentially speculative, as a rule, bona fide adventuring is what makes the world wag. Rhodes, Rudd and Beit were not so sure they were doing the safest thing when they amalgamated the Kimberley Diamond Mines. Before the Consolidation the gross capitalization of the four Kimberley mines was £23,434,250. Rhodes, counselled by Gardner Williams and Smith, wrote that down to £3,950,000, included two leaseholds, and made the fixed charges £320,000 per annum. Perhaps, nowadays, such a merger would have brought about a duplication or triplication of capital commitments. But there were (and there are) conservative mining financiers and engineers who are as chary of their reputations as the authority quoted at the beginning of this dissertation. Standards of valuation, unfortunately, are not always governed by the Golden Rule. We have seen Nipissing shares go to $34 and drop below parity, and yet Nipissing has distributed more in dividends than it was ever valued at in the market when "49" blew off the lid. Some of us suggested to wizards of finance that they invest in Hollinger shares at $3.75 and $5. The rebuff was, "You're crazy!"

Coniagas when capitalized at $4,000,000 was a sort of "air pocket", but we know what happened.

Nickel-copper ores were a liability, and "broke" Col. R. M. Thompson, and we have seen the aftermath.

Quick firing fiscal agents like the ex-President of the Stock Exchange do well to be admonitory. They would be more to the purpose were they to ascertain the true relationship of real mining to what transpires on 'Change.

Mr. Rickard's Sullivan Mine Projection

A hurried apology is necessary; because, a while ago, this department ventured to state that as the Sullivan Mine present ore reserves were estimated at 5,000,000 tons, a hypothetical valuation of the gross metallic content of that tonnage might be around $500,000,000. Now, along comes the circumspect, always erudite, and authoritative, Thomas A. Rickard, who writes in *The Engineering and Mining Journal-Press*:

"This mine has enormous reserves of a complex silver-lead-zinc ore, the estimates of tonnage being well above 25,000,000."

Simple arithmetic could make that worth "well above" $2,500,000,000 gross. Of course there are "ifs" in the argument; yet Mr. Rickard gives the estimate publicity over his signature. According to all accounts, the "new 1,500-ton mill, with an expected working capacity of 2,000 tons," will have sufficient feed for "well above" 40 years.

Incidentally and in the interim, there ought to be linings for the pockets of shareholders. Differential flotation of coin of the realm in their direction is something to which they are not averse.

Canada's Red and White Metals

The statistical position of copper is a disputed point. It is liable to continue so until the industrial front is broader and international trade has the hobbles off. United States production of copper in the first seven months of this year is placed at more than 500,000,000 pounds, while consumption is not what producers wish it. No doubt a general resumption of trade is impending. Meanwhile Canadian nickel-copper corporations are begirding themselves and hope to get off to a running start. One statement is to the effect that International Nickel operating chiefs expect to smelt in each furnace at the rate of 100,000 tons of ore per month. That would mean the highest state of efficiency. It was never done in the past—but Copper Cliff should put the past in eclipse with its completed plants, improved practice and that Creighton grade of ore. If need be, the Creighton could draw on its broken ore and make competitors very uncomfortable.

British-America operations also are to be resumed—to what extent naturally will depend upon circumstances. The Mond people, like the International, have arranged for larger markets, to which their new mill in Pennsylvania will be an important addition.

In the West, the Canada Copper Company is undergoing another of those periodic reorganizations, which are not helpful in the furtherance of Canadian copper enterprises. It has been decided to incorporate a new company with 700,000 shares of $10 per value. There are to be no bonds or preferred stock. Present holders of the securities of all kinds alone will be allowed to participate. Holders of first mortgage 6 per cent bonds, $2,500,000 principal amount, which are in default $300,000 interest since July 1, 1920, may exchange their bonds par against par for stock in the new company to be formed, receiving 250,000 shares. They may also subscribe for 200,000 additional shares pro rata at $5.

Holders of 5 year 6 per cent debentures in the original company, $710,000 principal amount, must subscribe at $5 a share for new stock, in the proportion of 20 shares for each $100 face value of debentures. This should account for 71,000 new shares. Subscriptions at the same rate for the 200,000-share block are also acceptable.

Stockowners of the first reorganized company may subscribe at $5 a share for stock in the second reorganized company, in the proportion of 1 for 11. Those who do not subscribe for new stock, receive nothing at all. This item calls for 100,000 shares of the forthcoming issue. An additional 49,000 shares are reserved to cover reorganization expenses.

Stock of the new company has not been underwritten, and the plan will not become effective unless 160,000 shares or $800,000 are subscribed. In event of failure the properties are to be foreclosed for benefit of first mortgage bondholders and subsequent formation of another company in which present security owners would receive no equity.

Unfortunate as it is to have Canada Copper affairs involved in what is obvious, it is gratifying to have Granby Consolidated report progress and profit. This company in June produced 2,450,477 pounds of copper, compared with 2,522,000 pounds in May, and with 1,974,162 pounds in January. The outlook for the company, according to an official, is very favorable. The company's costs at present are, approximately, 9.7 cents a pound, which permits a profit of, approximately, 4 cents a pound on operations. Earnings for the current year, it is estimated, will amount to better than $7 a share on the outstanding capital stock.

The Mining Districts

BY THE JOURNAL'S CORRESPONDENTS

NORTHERN ONTARIO

South Lorrain

Due to very favorable results at the Frontier and Keely properties in South Lorrain, claims in that district are looking up, and it would not be surprising to see some deals negotiated in the near future. Among others the Belle Ellen shareholders have authorized the president to negotiate with a view to selling or refinancing.

The results being met with at the Keeley are exceptionally favorable and the mine has a large number of faces in high-grade ore. August production was 80,000 ounces, a record for the property since being reopened, and it is anticipated that monthly production for some time to come will average about this figure.

The Mining Corporation, which is operating the Frontier, will soon have to decide what to do with the mill rock. Before deciding to build a small mill, which would run into a good deal of money, the company will investigate the question of hauling the ore to Cobalt for treatment in the company's mill. It is believed that tractors, particularly in the winter time, could haul the 20 miles at a cost sufficiently low to make this proposition attractive.

Gowganda

Recent developments at the Castle property in Gowganda have also been very favorable and properties in the Miller Lake-O'Brien-Castle area are attracting attention. The Castle is investigating possible sources of hydro-electric power, and is also considering the installation of a 50 ton mill.

Work is under way at the Miller Lake-Everett property adjoining the Castle. Development will be carried on from the No. 1 shaft of the Castle, which was sunk close to the boundary.

Production at Cobalt

The August report of the Nipissing shows that during the month the company mined ore of an estimated net value of $189,258 and shipped bullion and residues from Nipissing and customs ore of an estimated net value of $394,406. The low grade mill treated 7,558 tons and the high-grade plant, 205 tons, while the refinery shipped 352,883 ounces of bullion. There were no new developments of importance underground, during the month.

The McKinley is producing at the rate of 45,000 ounces a month, largely from mill rock and is understood to be making a fair profit.

For the week ending Sept. 15th, three companies shipped ore from Cobalt. The Nipissing and Mining Corporation shipped a total of 900,000 pounds of residues and the Dominion Reduction shipped 85,000 pounds of flotation concentrate from Peterson Lake tailing. During August there was shipped a total of 2,332 tons by six companies. Of this amount 2,144 tons were residues shipped by the Nipissing and Mining Corporation. Of the total tonnage shipped, 1,910 tons went to the Deloro Smelting Co., 265 tons to the Comagas Reduction Co., 73 tons to Perth Amboy and 84 tons to Carnegie.

Continental to Offer Stock for Sale

It is understood that the Continental Mines, Limited, will shortly make a public stock offering. This company is the holding company for the Menago which has the Colonial property in Cobalt; and also the Norlanda company, which owns a large acreage in Kirkland. The Continental has a capital of $3,500,000 in shares of $5 par, of which the promotors have the larger part.

Sinking Resumed at V. N. T.

Water troubles have been overcome at the Vipond in Porcupine and sinking to the 1,000-foot level has again been started. It is expected that this depth will be reached in December.

Goldale

Negotiations have been opened for the purchase of a number of claims belonging to the Goldale company. Of these, 120 acres are in the vicinity of the Dome and two groups of claims north of the McIntyre.

Dome Lake

Preparations are being made to dewater the West Dome Lake properties preparatory to sinking the shaft from 600 to 1,000 feet.

McIntyre

Big things are being predicted for the McIntyre and in a few weeks the mill will be treating 1,000 tons a day. Since the new mill unit started the opportunity is being taken to overhaul the old part of the mill. The ground between the 1875 and 2500 foot levels will be opened up as soon as possible.

Lightning River

Operations have been suspended at the Lightning River Gold Mines, but it is expected that work will be resumed during the winter when necessary machinery can be hauled to better advantage.

Thesaurus

Good results were encountered on the 100 foot level of the Thesaurus property in Matachewan and the shaft is now being deepened to 200 feet. It is expected that hydro-electric power will be available from the Indian Chutes development about the first of the year.

High-Graders Arrested

Recent arrests in connection with the high grading of gold precipitate from the Hollinger indicate a widespread organization extending into Porcupine and Kirkland, with operation covering a considerable period of time. A small furnace and over $1,000 worth of precipitate was located in Toronto.

A BUDGET FROM THE NORTHLAND

Lightning River

The recent discovery of rich gold ore in Holloway township is drawing considerable attention to the Lightning River area southeast of Lake Abitibi. The summer's prospecting campaign of the Canadian Syndicate has given results that should bring about extensive prospecting of the neighbouring claims. There is considerable overburden in the area and it will take work and time to demonstrate the value of the properties. Sufficient has been learned already to indicate that the chances of further noteworthy gold discoveries being made are good. Prospectors and engineers are busily at work trying to discover more ore, and camps are being built with a view to

on prospecting during the coming year. The discovery vein shows abundant grains of gold and is very rich. Neighboring outcrops are now being stripped and some pronounced shear zones have been found. On another property a mineralized red porphyry in basalt has been stripped for several hundred feet. A number of outcrops are of conglomerate and greywacke with slaty bands. The area is, in fact, made up of formations usually found in Northern Ontario gold areas and the recent discovery of rich ore, together with the earlier discovery on the Cochenour property a few miles south, will warrant intensive prospecting.

Goldale

At the Goldale the shaft has reached a depth of 540 feet, and a loading pocket has been cut for handling ore and rock from the work at the 500-foot level. The development of the ore zone is now beginning and in view of what is already known about it, the work of the coming months should result in important orebodies being opened up. Additional plant is being installed, an 80 h.p. tubular boiler having recently been added. The shaft and station are timbered and sumps cut for collection of water. The shaft has been unusually well constructed and its use as a main orehoisting shaft is evidently contemplated.

Rochester

Shaft sinking at the Rochester has been recently delayed by a heavy flow of water. A steam plant has been installed to keep the workings clear in case of a shortage of power. The work already done in the shaft has resulted in the discovery of a new vein.

Newray

At the Newray two diamond drills are in operation and the locating of the ore zones is under way. Mr. John Redington is in charge of operations, which are being carried on by Coniagas Mines Ltd., under an option agreement.

Shining Tree

Development is proceeding steadily at the Ribble-Wasapika property, drifts being run at the 100-foot and 200-foot levels. Additional houses are being erected to take care of a larger number of workmen.

Shaft sinking at the Herrick is well under way. The shaft is down about two hundred feet. The Tonapah Mining Company is operating the Herrick.

Blue Quartz Mines

At the Blue Quartz mine, east of Matheson, the development work continues to give encouraging results. Drifting is in progress at the 200-foot level and some good ore has been encountered.

Experiments at Hollinger

There is considerable interest being taken in the crushing experiments being carried on at the Hollinger. The rod-mill, which is new to the district, is evidently giving good results and some account of its performance is awaited with interest. That it is giving satisfactory results is evidenced by the dismantling of its competitors in he trial runs.—R. E. Hore.

NORTHWESTERN ONTARIO

The Red Lake Silver Strike

Interest is being aroused by further reports coming in from the Red Lake district. Miners are coming into Kenora in considerable numbers, and have recorded many claims. They report 15 miles of the "silver belt" staked solid. The silver bearing formation is reported to be five miles long and of undetermined width. It is not thought that the full length of the belt has yet been determined, and there is hope that further extensions will be located. The lateness of the season and the difficulties of transport have not deterred a movement in the direction of Red Lake. Already parties are being organized in Northwestern Ontario preparatory to a prospecting campaign in that field this Fall. One party headed by Don. Gibson and Mr. Greenley, recently in charge of mining operations at Silver Islet, left Port Arthur yesterday for Red Lake, and other syndicates are being organized that will be under the direction of competent prospectors and engineers.

Silver at Schreiber

An interesting discovery of silver has been made by William Longworth, on claim TB.3850, in the Schreiber area. The vein outcrops on the shore of Lake Superior, on Location 2, and strikes inland, east of north, forming a distinct break in the rock, to where the find was made, about a mile from the shore, the intervening portion being mostly covered with drift. At the point of discovery both the vein and country rock show good silver values. Until further work has been done, no definite statements can be made regarding this find, beyond the fact the few shots that have been put in have disclosed unusual values that warrant more prospecting.

Atikokan Mine Leased

The well known Atikokan iron mine has been leased to Clement K. Quinn & Co. of Duluth, Minn., one of the largest independent iron ore operators in the Lake Superior region. The lease is for thirty years, at fifty cents per ton royalty, on a minimum basis of 100,000 tons per year, for the four year period from 1923 to 1926, both years inclusive, and 200,000 tons per year for the remaining twenty-six years. The royalty is payable quarterly and the first payment becomes due April 1st. 1923. Mayor I. L. Matthews of Fort Arthur, representing the city as one of the bondholders of the Atikokan Iron Company, signed the lease of the 18th. instant. The closing of this transaction means that active mining operations will be carried on at this property in the near future. Clement K. Quinn & Co. formerly held a lease on this property, but dropped it without carrying on any mining or other work, by mutual agreement, during the severe depression in the iron and steel trade in 1921.

In addition to the Atikokan Mine, Messrs Quinn & Co. have taken over under lease all the iron lands held by Maskensie, Man & Company on the Atikokan and Mattawin iron ranges, together with the iron land holdings of Gano & Shepherd on the Atikokan range. These lands cover many thousands of acres, and represent immense tonnages of ore, that under responsible and capable operators, should give an impetus to industry that will be felt all over the province.

Dwight E. Woodbridge, E. M. of Duluth, Minn. is examining iron deposits this week in the Whitefish Lake area, west of Port Arthur.—J. J. O'Connor

NOVA SCOTIA

Labor College Mooted at Glace Bay

The leaders of labor round Glace Bay are discussing the opening up of a labor college. To gain information Dr. Clarence McKinnon of Halifax was asked to address a meeting of all interested in the project. He appeared before them and told how the project could be realized and what the benefit a study of economics should be

to the working classes. After the speaker left the room it was agreed that an effort should be made to begin the work of education among the miners. If sufficient money could be had it was thought that a series of lectures could be conducted during the winter months. Prominet labor men are to be approached to support the cause by giving a small monthly contribution, while it is understood that the different locals of the United Mine Workers are to be asked to contribute as they can.

If the proposal has for its object the teaching of economics it will be welcomed by all who know the leavening influence education has on the public mind. It will have the support of all sound thinking men and its work will be eagerly followed. But if its object is to spread more "Red" propaganda, then it were better that the scheme were still-born. Institutions for the education of workmen in Britain have been of great benefit, and where these have been conducted with no other propose than to inform the mind and fit the workers for the full responsibility of citizenship they have had a wonderful effect in sobering and steadying the masses and their leaders in the troublous days through which they have been and are still passing. Britains labor forces have been and are still passing. Britain's labor forces have shown remarkable wisdom as their responsibilities increased, and to the educational effort of the labor party is largely due the success obtained. On the other hand there have been certain groups that aimed at perverting the laws of the nation and the institutions of these anarchists have been forcibly closed. If it should happen that thoughts of a school of this kind are entertained by those who, while sincere in their desire to ameliorate the ills of the working classes, are nevertheless going the wrong way about it, then a new weapon will be placed in the hands of men whose only attitude up to the present time has been to try to shock the public mind into thinking along communistic lines. The spirit of ideal communism and that shown by the labor leaders and their public meeting at Glace Bay are as far apart as the poles.

The system of education most needed among the miners of many parts of Nova Scotia is one that will teach men to respect each other sufficiently to show civility at their meetings, to tolerate of the opinions of others, to forget their differences for a short time at least, and try to fall into line with other public spirited men who also are laboring for the common interests of our whole people.

BRITISH COLUMBIA

Mineral Exhibit at Prince Rupert

Some fine specimens of the ore of Hudson's Mountain, Hazelton District, B. C., were on exhibition at Prince Rupert recently. A sample from the Mamie Mine assaying 5,000 ounces to the ton high-grade gold-silver copper ore from the Venus, Victory and Shamrock Groups, and high-class samples of gold-silver-lead ore from the White Swan were included in the display. There was also some fine bituminous coal from Lake Kathlyn, B. C., lead-silver-lead and copper-gold ore a high place was given the exhibits of the Kleanza Co., Ltd., of Usk. The Granby Consolidated M. S. & P. Co. was represented by an interesting collection of its ores and concentrates.

Winter Shipping of Mayo Ore

The Treadwell Mining Company proposes using caterpillar tractors in the haulage of ore from the Mayo Camp this winter. They have found this method of transportation successful during the summer and are convinced that it can been adapted to the snow roads of the north. The Company has 2500 tons of silver ore in sight for shipment. Keno Hill, Ltd., will use horses and sleighs after the close of the river for the transportation of between 3,500 and 4,000 tons of ore. This winter's shipments are expected to be double those of last year in volume and most of it already has been mined and stacked.

It is reported that the Treadwell Company has made another strike of silver ore at the 200-ft. level, the vein being from eight to twelve feet in width. Assays are said to show 300 ounces of silver to the ton. A shaft is to be sunk to the 400-ft. level and, if the values are maintained at that depth, it is the intention to instal a 50 ton concentrator.

Telluride Ore in Chilcotin District

An important strike of telluride ore is said to have been made in the Whitewater section of the Chilcotin District, British Columbia. Veins are reported to have been uncovered from which rich samples have been taken, the covering being no more than from two to three feet. J. Russell and H. Schwartz are named as the two prospectors who have staked the most promising claims. There has been many claims taken up in the district during the season.

The Jack Paul Mining Co., of Spokane Wn., has taken up some prospects in the vicinity of Rock Creek, Grand Forks District B. C. F. Keller, a mining engineer well-known in western Canada, is associated with the enterprise.

Ore for Shipment from Esperanza Mine

Some beautiful specimens of ruby silver crystals have been taken from the Esperanza Mine, Alice Arm, and are on exhibition in the town. They were found in the high grade vein from which considerable rich ore has been shipped. This vein is said to be increasing in width, varying now from 18 to 24 inches. The main ore-body is about 6 feet in width. There will be considerable ore shipped from the property next winter, as the government has widened the trail and snow will help transportation.

Hon. J. H. King Discusses Iron and Steel Project

Hon. J. H. King, Minister of Public Works for Canada, who has been touring British Columbia, conferred with the members of the Provincial Government with regard to the iron and steel plant it is proposed establishing under the joint guarantees of the Provincial, Dominion, and Imperial Governments.

Another Mining Plant Burned

The main plant of the Red Mountain Mine has been destroyed by fire. The mine is situated in Washington State, Mount Baker District, but is accessible only from the Canadian side. The compressor room and the ore bins are completely wiped out and, in order that operations may continue unhampered, rebuilding must be undertaken. The property changed hands recently for a sum approximating $800,000, according to report.

Col. Oscar Butler Perry, mining engineer with the Guggenheim Exploration Company, passed through Vancouver B. C. recently from the Orient. He has circled the globe, his last stop of importance being at the tin fields of the Malay Straits where his principals are developing an industry.

Transcontinental Highway Runs Through Mineral Areas

A trans-continental highway is being built in Canada by the Dominion Government with the assistance in each province of the provincial governments. In British Columbia the work is well in hand and the roadway will serve, not only for tourist travel, but to open country rich in mineral as well as in other resources. This is especially true of the Rossland Cascade Section, now in hand. The road will give connection between the historic and still productive Rossland District and the Boundary Country. About a year ago Rossland lost its railway service when the Great Northern branch was closed down. Since that time mining there has been at a low ebb. With a good road tapping the mines and running through to a smelter or to railways having connections with a smelter, there will be many properties now dormant that again will become producers.

Trail Ore Receipts

Ore receipts at the Trail Smelter, Canadian Consolidated Mining & Smelting Co., for the week September 1 — 7 totalled 6425 tons. There were three new shippers from the Slocan District, namely, the Black Colt, Last Chance, and the Mountain Consolidated. The Lanark Mine, near Revelstoke, also made a contribution. The mines of the company shipped 5548 tons.

Two-year Agreement with Coal Miners

An Agreement has been entered into between the management and the employees of the Western Fuel Corporation of Canada, Nanaimo B. C., to take effect on the 1st of October next and to continue in force for two years from that date.

The minimum wage per day to be paid the coal miner is $4.25¼, it being understood that the Superintendent of Mines shall be the judge as to the ability of the miner to earn such minimum. In addition the Company agrees to pay all employees a bonus of $1.00 per day worked. "It is mutually understood by the Company and its Employees that any increase or decrease in the bonus herein mentioned shall be governed by competitive conditions." The former bonus was 88 cents per day worked.

The price of coal to employees is set at $3.00 per ton.

Under the schedules mining and yardage pay is given as follows:

Mining — Wakesiah and Reserve Mines, and No. 1 Upper Seam, 91¾ cts. per ton.
Upper Seam, coal under four feet in thickness, $1.08 per ton
Lower Seam, $1.08 per ton.

Yardage — Upper Seam — Level $3.37 per yard and coal
Crosscuts - $2.70 per yard and coal.
Levels - when less than one half of height is in white rock $10.12½ per yard. Coal to Company.
Levels - when more than one half of height is in white rock, $10.80 per yard. Coal to Company.
Turning Stalls - Five yards long by twelve feet wide, $13.50 and coal.
Brushing rock - One foot thick, $1.35 per lin. yard.

The day rates range from $3.71¼ for muckers to $4.99½ to machine foremen. To these, of course, must be added the bonus already referred to.

At the miners' mass meeting it also was decided that Hon. Wm. Sloan, Minister of Mines, would be asked to exclude Orientals from the mines and that the appointment of boards for the administration of the Widows' Pension Act be better acquainted with the needs of beneficiaries.

New Colliery on Vancouver Island

That there will be another producing coal mine on Vancouver Island soon, would seem assured, as J. J. Grant, former manager of the Nanoose-Wellington Collieries, has secured a considerable acreage of coal-bearing land adjacent to the old "Jingle Pot" holdings, near Nanaimo, and is authentically reported to have pushed development close to the shipping point already. Mr. Grant has a first-class colliery equipment, complete in every respect, according to report, and the new mine should materially add to the annual coal output of the Vancouver Island fields.

Fatal Accidents at Working Face

There have been four fatal accidents in the coal mine of British Columbia within the past few weeks, caused by falls of coal or of rock, all of which, with one exception, occurred at the working face. One took place at Nanaimo, another at Fernie, a third at Merritt, and the last at Cassidy.

Hon. Wm. Sloan, Minister of Mines, has noted the recent increase of these fatalities with concern. He has stated that falls of rock and coal are a constant menace to the coal miner and that in late years the majority of the fatal accidents in the coal mines of the Province has been caused by such falls. Undoubtedly, he stated, many are unavoidable accidents, occurring after every known precaution has been taken; but a proportion are preventable. More especially is this so if timbering regulations are complied with.

At present, the Minister pointed out, the demand for coal on the Pacific Coast is urgent. The collieries are working at capacity. It is possible that, under these circumstances, chances are being taken that, under normal conditions, would be avoided. Holding this view, he is determined to obtain all possible information regarding the recent accidents mentioned and, accordingly, has given George Wilkinson, former Chief Inspector of Mines, a special commission to make a thorough inquiry into each case. Mr. Wilkinson will undertake the work immediately and submit his report as soon as possible.

Mr. Sloan states that, if there has been any laxity in the observance of the regulations under the Coal Mines Regulation Act, especially as to timbering and the special rules applicable to the operating companies, he wants to know it. Similarly, if there is anything that can be done to further improve conditions as to safety at the working face, he wants to be informed of it without delay

Too Many Coal Mines, Increases Cost of Coal

George S. Rice, chief of the mining division of the United States Bureau of Mines, who has been in British Columbia investigating the "blow-outs" in the Cassidy Mine, V. I., Granby Consolidated M. S. P. Co., made a statement before leaving the Province touching on a few poins of the present position in America with regard to coal production and supply.

"Indiscriminate competition" has been the cause of the high cost of production. The theory that the more coal mines then are the lower will be the cost, is unsound. Output might be so great that the mines could work only part time. Thus overhead expense is increased and the public has to pay the bill.

Some of the United States mines work only half of each year, the average being about 210 days. The railway mines and those supplying the steel industry work

without cessation, while those supplying the general public often do not operate more than 180 or 190 days in a year.

Mr. Rice would remedy the evil through federal government regulation. He would have the Inter-State Commerce Commission refuse trackage rights to any company wishing to open a new mine until it had proved in open court that the mine was needed. In this way the number of mines would be kept to the point where they would all be able to operate at full time. This, it is thought, would result in a drop in coal production costs of perhaps twenty-five per cent. The existence of too many mines would be quickly remedied through the annual increase in the consumption and the working out of mines.

Government ownership of coal mines is not favoured by Mr. Rice, who claims that experience has proved its unsoundness. Even in Germany where, in pre-war days the best form of government for the carrying out of such a policy existed, it was not a success.

The statement of Henry Ford that there was no shortage was said to be incorrect. The scarcity of coal has been real and the situation in the north central and north Atlantic states, as well as in parts of eastern Canada, might be expected to be serious this winter. A shortage of anthracite was probable in some of the big cities such as New York and Philadelphia, and soft coal would have to be used by people not accustomed to it nor prepared for it.

PROGRESS IN THE CARIBOO

Cariboo, in sympathy with mining generally, is receiving a fair share of attention this season. Although the unprecedented drought has to a considerable extent impeded hydraulic mining, the chief source of gold production in the district, some attention is being directed toward other sources of gold mining, particularly dredging and quartz mining.

While the district was first made famous by the rich placer areas in Williams Creek, Grouse Creek, Lowhee Creek, and a number of other creeks, new discoveries on shallow diggings in recent years have been rare. Still, the recent discoveries in the Cedar Creek district has created a renewed interest in "poor man's diggings," especially on higher levels. According to old timers, exploration or prospecting of the higher benches has been practically nil. The chief hope of the placer miner has been the number of deep unprospected creeks and valleys of the gold zone, a large extent of possible dredging ground, or really big hydraulic areas.

There are several hydraulic drills operating in the district testing dredging areas, and a fair proportion of them are finding gold in commercial values.

The hydraulic plant on Lowhee Creek operated by John Hopp has reached within a short distance of their reservoir, making it necessary to abandon it and construct a new one a mile further up the gulch. They have now a gang of men extending their ditch and building a new dam. It is also the intention of the Company to move their large hydraulic plant from Stout's Gulch to Konkline's Gulch. Konkline's Gulch is a tributary of Williams Creek and one of the rich drifted creeks of the "arties and like Stout's Gulch, now worked out. It is said to contain some very rich yardage values.

John McDougall has struck some rich pay in the deep ground of the unworked part of Jack O'Clubs Creek. The Homer Bell operating at the mouth of the Devil's Canyon has struck rich pay gravel, believed to be from an unworked channel in Grouse Creek. If this proves to be the case, it will develop into an extensive hydraulic property.

In view of the number of quartz discoveries in the district, local attention is being diverted from placer to quartz mining. These new discoveries make it more obvious that the gold zone strikes in a north westerly and south easterly direction and cuts the heads of the rich creeks in the district. Two outstanding gold quartz discoveries have been made this season, the first during May, by Al. Sanders, an old experienced prospector, whose find was in the north westerly slope of Lowhee Mountain, although there is as yet insufficient work done to determine the importance of this discovery. The outcrop indicates a vein from six to twelve feet wide. The vein strikes N. W. with the formation and like most veins in the district dips nearly vertically, while the prevailing dip of the country rock is to the north. While Mr. Sanders' object is primarily to strip the vein, he does a considerable amount of panning in order to keep posted as to values, and his daily pan washup amounts to approximately an ounce a day, which indicates that at least the part of the vein he has uncovered is high grade. This is the second discovery made by Mr. Sanders in a year, the other one being on the Williams Creek slope of Proser Pine Mountain. The distance between these two discoveries is approximately 2½ miles. The vein in the latter discovery is considerably broken over, and it will require considerable development to determine its size and regularity.

Another strike that is attracting considerable attention was made recently by Ernie Moore in the same mineral zone but about fifteen miles south easterly, between the headwaters of Cunningham and Harvey Creeks. Here Mr. Moore has uncovered a vein about sixty feet wide highly impregnated with iron and galena. Where oxidized it shows free gold. These two strikes have caused a certain local excitement and as a result quite a number of claims have been staked.

Dr. W. L. Uglow, in charge of the Dominion Geological Survey party working in this district, has been making a painstaking examination of the geology in the district, including the new discoveries, as well as the discoveries made a few years ago in Proser Pine Mountain. Joe Errington, an easterner representing Porcupine interests has been examining properties on Proser Pine Mountain with a view to purchase. He is expected to return to the district shortly.

Advertisements other than "Employment Wanted" or "Employees Wanted" will be inserted in this department at the rate of 20 cents per agate line (14 agate lines make one inch) $2.80 per inch, each insertion, payable in advance. Space measured from rule to rule. When four or more consecutive insertions of the same advertisement are ordered a discount of 25 per cent. will be allowed.

Advertisements of "Wanted Employment" or "Wanted Employees" will be inserted at the rate of two cents a word, net. Cash must accompany order. If box number is used, enclose ten cents extra for postage in forwarding replies. Minimum charge 50 cents.

CHEMIST, experienced in blast furnace work, ... Hixes, etc., desires position. Address ... Mining Journal, Box 616, Gardenvale, Que.

To Holders of Five Year 5½ per cent Canada's Victory Bonds

Issued in 1917 and Maturing 1st December, 1922.

CONVERSION PROPOSALS

THE MINISTER OF FINANCE offers to holders of these bonds who desire to continue their investment in Dominion of Canada securities the privilege of exchanging the maturing bonds for new bonds bearing 5½ per cent interest, payable half yearly, of either of the following classes:—

(a) Five year bonds, dated 1st November, 1922, to mature 1st November, 1927.

(b) Ten year bonds, dated 1st November, 1922, to mature 1st November, 1932.

While the maturing bonds will carry interest to 1st December, 1922, the new bonds will commence to earn interest from 1st November, 1922, GIVING A BONUS OF A FULL MONTH'S INTEREST TO THOSE AVAILING THEMSELVES OF THE CONVERSION PRIVILEGE.

This offer is made to holders of the maturing bonds and is not open to other investors. The bonds to be issued under this proposal will be substantially of the same character as those which are maturing, except that the exemption from taxation does not apply to the new issue.

Holders of the maturing bonds who wish to avail themselves of this conversion privilege should take their bonds AS EARLY AS POSSIBLE, BUT NOT LATER THAN SEPTEMBER 30th, to a Branch of any Chartered Bank in Canada and receive in exchange an official receipt for the bonds surrendered, containing an undertaking to deliver the corresponding bonds of the new issue.

Holders of maturing fully registered bonds, interest payable by cheque from Ottawa, will receive their December 1 interest cheque as usual. Holders of coupon bonds will detach and retain the last unmatured coupon before surrendering the bond itself for conversion purposes.

The surrendered bonds will be forwarded by banks to the Minister of Finance at Ottawa, where they will be exchanged for bonds of the new issue, in fully registered, or coupon registered or coupon bearer form carrying interest payable 1st May and 1st November of each year of the duration of the loan, the first interest payment accruing and payable 1st May, 1923. Bonds of the new issue will be sent to the banks for delivery immediately after the receipt of the surrendered bonds.

The bonds of the maturing issue which are not converted under this proposal will be paid off in cash on the 1st December, 1922.

W. S. FIELDING,
Minister of Finance.

Dated at Ottawa, 8th August, 1922.

EDITORIAL

The geologist will be of even greater service in northern Canada than he has been in the south, for he has now the accumulated experience of years in Canadian geology on which to base his opinions.—F. D. Adams—1912.

IRON BY ELECTROLYSIS

Since the successful commercial establishment, recently, of an electrolytic iron industry at Grenoble, France, there has been a marked revival of interest in this simple and effective means of procuring pure iron from its ores. The direct production of iron, chemically pure, by means of an electric process that uses without waste almost the sum total of the energy supplied, has features that commend it not only at this time, when pure iron and its derivatives are of increasing use and value, but in this country, where there is super-abundant electric power, abundant iron ore, and a general industrial development that is merely in its infancy and that gives promise of remarkable expansion during the next few decades.

It would appear that, of all the countries where electrolytic iron might be made commercially, Canada is the most favoured of nature. In both the east and the west, hydro-electric power can be developed in colossal amounts at a cost that allows of its application to electro-metallurgical processes. In both the east and the west, most of the power thus available is remote from large agricultural areas and general industrial communities whose competition for the power might raise its price. It is probable that the use of this power will depend largely upon the development of electro chemical and electro metallurgical industries.

Though Canada is, so far as is known at present, poor in iron ore suitable for direct use in the blast-furnace, she has an abundance, both in the east and the west of other ores of iron, both sulphide and oxide. The present attempt at Trail British Columbia, to make use of the pyrrhotite gangue from the huge ore deposits of the Sullivan mine illustrates the direction in which an indigenous Canadian iron industry may be developed. If the metallurgists at Trail should succeed in separating economically the iron and sulphur from the Sullivan ore, as already they have done the silver, zinc and lead, British Columbia's long desired iron and steel industry may become established without more ado.

We print to-day an account by Mr. Axel Estelle of two processes for the production of electrolytic iron, with by-products, that he has worked out recently. The practical details that elucidate and amplify his chemical equations show that his processes are based, not merely upon ideas transferred to paper, but upon practical experimenting. A considerable part of the data he gives and the conclusions he draws is common to other similar processes; but he has new data and new conclusions that make his paper worthy of close study.

The possibility of producing iron from its compounds with sulphur seems rather remote, to those of us accustomed to rely upon the blast-furnace with its cheap raw materials and its unrivalled economy of operation. Many an attempt has been made to use pyrrhotite or pyrite as an ore of iron by means of putting the sulphur into saleable form, generally in the form of sulphuric acid. In Canada, this use of the iron sulphides has been unprofitable because of the limited market for sulphuric acid. If, however, the sulphur could be recovered in its native form, a new field would be opened which would bear close examination. The Estelle process for sulphide ores of iron proposes the recovery of pure iron and sulphur, with any precious or semi-precious metals concentrated in a small residue.

Ordinarily we consider the oxygen of oxide ores of iron as something merely to be got rid of at the least possible expense. The Estelle process proposes to catch and use this oxygen after it has been separated from the metal. The use of oxygen in modern industry is increasing very rapidly. It is possible that here lies an opportunity for producers of oxygen to manufacture the gas in a way that will aid materially in promoting our production of iron from Canadian ores. The magnetic concentrate from our low grade ores would be especially suitable for this purpose.

IRON ORE DEPOSITS IN NORTHWESTERN ONTARIO TO BE OPERATED

It would appear that at last the more promising of the iron ore deposits of northwestern Ontario have fallen into the hands of operators who will really operate. Clement K. Quinn and Company are one of the most substantial and most progressive firms among the independent iron ore miners and dealers of the United States. Since so many Canadians (most of them amateurs in the iron ore business, to be sure) have failed to make a commercial success of opening up these ore deposits, and since British iron and steel men are not interested in stimulating and

taking the development of a Canadian iron ore industry, it is satisfactory to have a competent American firm undertake to make use of these resources.

As yet it has not been disclosed what direction the projected attempt will take. Mr. Quinn is said to have taken over not only the Atikokan deposits but a part of the Mattawin iron range as well. The beneficiation of the ores of these two ranges presents separate problems, as sulphur is the deleterious element in the case of Atikokan ore, while the Mattawin ore is high in silica. It is significant that there is available on the Mattawin range, close to the railway, a very large amount of banded magnetic iron formation, available by quarrying and higher in iron than is that now being treated at Babbitt, Minnesota. If the treatment at Babbitt should prove to be commercially feasible, then it goes without saying that the ore of the Mattawin range, higher in iron and similar in other respects, will be amenable to the same or similar treatment.

Should the enterprise of this American firm result in the successful establishment of a Canadian iron ore industry, it is to be hoped that Canadians will follow suit in some of the remaining localities where low-grade iron ore is available in abundance. Our best efforts up to the present have fallen short of complete success; but that is not sufficient reason for abandoning the attempt to put our Canadian iron and steel industry on an independent and secure footing.

CAPITAL FOR MINING DEVELOPMENT

It is a truism that Canada, in common with all new and growing countries, has not adequate facilities for developing her natural resources at the rate she wishes. Particularly does she lack capital sufficient to take advantage of all the opportunities her resources offer. In no part of her industrial organization is this more apparent than in her mining industry.

If we look over the mining fields of Canada, we will find that the larger part of them, as well as the more successful part, has been developed by means of capital obtained from the United States. Canadian and British capital have, in places, been very successfully applied; but the lion's share of the work has been done by the eagle on the American dollar. We allow this metaphor to stand, badly involved as it is, since it suggests the undoubted fact that Britons, as well as Canadians, have been slow to take advantage of opportunities that have been grasped promptly by our American neighbours.

What do we pay for the use of this capital from abroad, and what benefit do we derive from it? This is rather an involved question; but a partial answer to it can be given simply. If the capital investment results successfully, we have the benefit of added employment and an increase of taxable property within our borders. The profits go abroad. The more profitable the venture, the larger is the fraction of the proceeds paid by Canada for the use of the borrowed money. Meantime the direction and control of the mining operations is in the hands of the investors, though in the last resort, of course, the state is the final authority.

There is, fortunately, an increasingly large amount of Canadian capital available annually for investment in Canadian mines. A fraction (much too large a fraction) of this capital falls into the hands of unscrupulous promoters and stock-jobbers, and thus does not become actually available for the legitimate purposes of the industry. Nevertheless Canadian investment in Canadian mines has now reached measurable proportions. Gradually, as the investing public is educated to the opportunity and becomes capable of discriminating between the genuine investment and the wild gamble or sheer shell-game, Canada will conserve the profit from her mineral resources by providing her own capital for their development.

While a large part of the general investing public remains, as at present, supremely ignorant of the basic facts of our mining industry and thus subject to the wiles of the ever-present member of the light-fingered fraternity, our main source of Canadian capital must be successful mining operators and investors who are ready to re-invest in the industry. These men know all the rules of the mining "game", and their money is spent to the best advantage in the exploring and prospecting, examination of prospects, preliminary development and mine development that they undertake. They are, of course, subject to error as all of us are; and many a prospector whose find has been turned down by their examining engineers will tell you that, each and all, they are looking for ready-made mines at bargain-counter prices. Nevertheless the fact is that professional mining investors are the soundest and surest means of developing our mining industry rapidly and economically. We hope that the numbers and the resources of Canadians thus interested in the mining industry of our Dominion will continue rapidly to increase, in order that they may hold for Canada, as well as for themselves, the full benefit of the riches with which nature has endowed us.

EDITORIAL NOTES

Through the courtesy of the Geological Survey, Ottawa, we are able to print today a full description of the geology of the Red Lake area, District of Patricia, where a silver find has created such interest. The report of Dr. Dowling's survey, made twenty-nine years ago, would have remained as little known to us as it is to the mining community at large, had not the Chief of the Division of Geological Information, Mr. Wyatt Malcolm, drawn our attention to it. We have here an instance of the practical utility of this Division of the Geological Survey, whose chief function it is to help make available to the public the vast store of useful information contained in the Survey's records,—much of it securely hidden there, but for the attentions of Mr. Malcolm and his staff.

It is interesting to note that in Toronto, civic spirit, making use of the powers of the fuel controller, has at last

succeeded in reducing the price of coal somewhat below the exorbitant level at which it has been for many years past. It is a fact well-known to those who wish to inquire even casually, that the coal trade of Ontario and Quebec is a monopoly, in the hands of a few wholesale dealers who are in complete agreement in their determination to keep prices at an artificially high level. The retailers must accede to this, whether they will or no. The wholesalers obviously do their scheming in collusion with the "coal barons" of the United States, from whom they draw their supply. This deliberate scheming virtually to rob the public is done by men who are otherwise high in the esteem of their fellows. It is looked upon as "good business." Actually it is one of the blots upon our civilization, and illustrates the fundamental cause of a vast deal of labour discontent and unrest. It is a flagrant violation of the principles we call Christian. We are pleased to note that a missionary, in the shape of a fuel controller, has made bold to penetrate the heathendom heretofore reserved to coal dealers.

Now that the situation in the near East has become less threatening, our precious cabinet in Ottawa has commenced to take it more seriously, presumably because the case now involves for them more definitely domestic political problems. The shame we felt first at being exposed by the action of our accredited representatives to the ridicule of the Empire and of the world, still persists; but now it is mixed with contempt for the bare faced juggling that tries to make political capital out of a national, and international, crisis.

When Samuel Champlain was organizing his expedition to Canada, in the year 1618, his letters of authorization contained some singularly interesting provisions. Amongst other things, he was instructed to take with him ten tons of lime. The presence of limestone round Quebec and Montreal was not then known. Two mill stones were also part of his cargo. This was carrying coals to Newcastle with a vengeance.

TOOL FOR GRIPPING SHEET METAL

Wherever sheet metal is used in a continuous manner some protection is usually provided to prevent the metal from cutting the operator's hands; but where this material is only handled occasionally, as, for instance, in a storeroom, no protective device is deemed worth the trouble and cost. Consequently, many badly cut hands often result. Illustrated in the accompanying photograph is a tool which has been used effectively for the purpose of handling sheet metal in a storeroom. With this device one man can pull out a sheet from a number of others and transport it with ease and safety. For wide sheets, two of these tools are used, one in either hand.

Materials for the tool are inexpensive and there is nothing complicated in the construction of it, the main part consisting of a short length of 2 in. by $\frac{1}{4}$ in. strap iron. This has a slot $\frac{1}{4}$ in. wide sawed out at right angles to the length, near the end, and near the other end a hole is drilled to clear a stud which is threaded tightly into a file handle, the whole being held together by a nut on the under side of the iron. A glance at the photo will explain to the reader how the construction of the tool permits it to grip the metal as soon as the handle is pulled and why

the tightness of the grip increases in proportion to the pull. It will be as well to add that no attempt should be made to smooth the edges of the slot; the rougher these are left the quicker the tool will grip. The device can, of course, be used in an opposite direction to that shown, i.e. upside down, and this position is preferable where the stock is some distance from the floor.

Harry Moore, Montreal.

NIGHT-WATCH

I rolled me in my blankets snug and tight,
And settled down all fixed to sleep all night
My pardner was a fat chap from the East,
Who didn't know my habits in the least
I hadn't been asleep an hour, no more,
When that there feller started for to snore!
Say, I have heard some snoring in my time,
But what he did was just one jeesly crime!
He trumpeted and gurgled like a whale,
And then he'd choke—I thought his heart would fail;
And then he'd start again, the sinned damned loon
I'd rather have a kyoot or a loon!
While he was bubblin' there like merry hell,
I wouldn killed him had I knew him well
I wouldn made him go outside and die,
And stop his bloody noise and let me lie
But as he was a stranger all I did
Was lie awake and never bat a lid

J. C. M.

The Estelle Process

ELECTROLYTIC REDUCTION OF IRON FROM ITS ORES

By AXEL ESTELLE

"Mining and Metallurgy" published in its number of December last year an article on "Commercial Production of Electrolytic Iron," describing the so-called "Eustis Process." This process, which produces electrolytically iron tubes from sulphide ores, is in the article said to be "unique in iron metallurgy." As the electrolytic production of iron tubes is already well known, the uniqueness of the process can only refer to the electrolytic reduction of iron from its sulphide ores.

This reduction as indicated by Mr. Eustis, however, is by no means new; the present writer gave long ago (especially in the American Letters-Patent 1,162,150 of November 30th 1915, and Canadian Patent 157,266 of Aug. 4, 1914) an exact description of it, far more detailed than has been done in the above mentioned paper. Besides, the invention was made in 1912, and the inventor filed an application for letters-patent for it in his native country, Sweden. He then, it is true, withdrew the application before it was submitted to public inspection, on account of his not meeting with a sufficient interest in his invention. The fact is that important deposits of sulphide iron ores are not found in Sweden; therefore the inventor was not inclined to protect a process that could be of advantage only to foreign countries and that, in fact, would be prejudicial to the export of high-class iron from Sweden.

The writer, having meanwhile taken up residence in Germany, then stated that certainly Canada, where, as well known, immense quantities of sulphide iron-ores are found, might have an interest in the process. For this reason he filed again applications, almost simultaneously, in Canada, the United States and Germany.

As a result of the war, the inventor was informed, only after the lapse of a number of years, that Canada and the United States had granted him the patents. An invitation to come to Canada in order to discuss the utilization of the invention never reached him until after the war.

Dissolving the Iron

In the above-mentioned article in "Mining and Metallurgy", to which the attention of the writer was drawn a short time ago, he sees that his idea has been taken up by other people.

The Chemistry of the Eustis Process is described in the article by the two equations

$$3\ FeCl_2 = Fe + 2FeCl_3 \text{ and}$$

$$2\ FeCl_3 + FeS = 3FeCl_2 + S$$

The first equation is identical with that of No. (2) of the above-mentioned American patent. What the second equation, in which the sulphide ore is represented by the mono-sulphide, FeS, signifies is contained in the lines 89-96 on Page 2 of the patent. The equation itself, however, has intentionally not been included, as the solution of the problem is not so simple as this equation would lead us to assume.

First it is to be observed that most of the sulphur compounds of iron are not soluble, or else rather difficult to dissolve, in dilute acids and in solutions of ferric salts. This is specially the case with iron pyrites, but also with magnetic pyrites or pyrrhotite, which, though it contains more sulphur than the monosulphide, is generally not much better for use. Therefore it is proposed in the patent to remove first this additional sulphur in any of the ways already known.

Difficulties of Using a Ferric Solvent

But, even when the mineral has been turned into monosulphide, a direct leaching with only a ferric salt solution is, for different reasons, hard to accomplish. The elementary sulphur, which precipitates as shown in the second equation above, has a very disturbing influence, especially as relatively hot solutions are necessary for the treatment. This sulphur, which coagulates in chloride solutions and does not remain suspended in a colloidal, finely divided condition, soon forms an impervious covering round the mineral grains and stops in this way the further reaction of the ferric solution. Moreover, we must remember that a ferric salt in aqueous solution is always partly dissociated hydrolytically into hydroxide of iron and hydrochloric acid, as this equation shows:

The degree of dissociation of the hydrocloric acid, however, is very high and for this reason the concentration

$$FeCl_3 + 3H_2O \rightleftharpoons Fe(OH)_3 + 3HCl$$

of the H-ions will surpass the ferric-ions. The chloride of iron accordingly does not react with the iron sulphide in the simple way that the second equation indicates in the article mentioned.

The hydrochloric acid formed by hydrolysis reacts on the iron sulphide and releases an equivalent quantity of hydroxide of iron, by which reaction sulphuretted hydrogen at first is formed. All the latter, or at least the larger part of it, reduces unaltered chloride of iron and precipitates sulphur. The hydroxide of iron at first set free is turned by the surplus of chloride into soluble oxychlorides, which however, as fast as the chloride becomes reduced change into soluble basic combinations as, for example, $Fe_2\ Cl\ (OH)_5$. Finally, when the greater part of the chloride has been reduced, sulphureted hydrogen escapes and the reaction might be the following:

$$5FeS + 4FeCl_3 + nH_2O = 5\ FeCl_2 + 2Fe_2Cl\ (OH)_5 + 5H_2S + (n\text{-}10)\ H_2O$$

The consequence of the hydrolytic dissociation of the chloride of iron is that when leaching, if there is no free acid, besides sulphur, all kinds of insoluble basic ferric compounds are formed, which also work disturbingly in many regards, and part of the sulphur escapes as sulphuretted hydrogen.

Another disadvantage connected with the leaching of the ore with chloride of iron is that part of the sulphur, although but a small part, oxidizes to sulphuric acid and that the solution is getting more and more sulphate-containing, which should be avoided when reducing pure iron.

Should the ore, together with iron, contain any other sulphides of metals that might be of use, then the direct leaching with chloride of iron is still more unsuitable, as these foreign metals are dissolved, although not quantitatively. There is obtained not only a solution of ferrous chloride containing compounds of other metals, which solution must be specially treated before electrolysing in order to utilise these metals and get the purest iron possible, but also a residue of gangue, sulphur and sulphides of metal that remain undissolved and that cannot always be economically treated.

The Estelle Process

All the above mentioned disadvantages and difficulties are avoided by the invention of the author. The process according to this invention consists essentially in first leaching the raw material with weak non-oxidizing acid and in then separating the iron electrolytically with insoluble electrodes from the solution of the salt of iron so formed, a suitable method being employed for continuously regenerating the solution as diagrammatically shown in the drawings filed with the patents.

One of the figures illustrates the various steps by which the iron and sulphur are separated from each other and from the residue of the ore, the leaching being done simply by a dilute non oxidizing acid. The other figure illustrates the same when a part of the ferric solution produced by electrolysis is used with the same dilute non oxidizing acid as leaching fluid. The process is the same, step for step, the difference being the addition of supplemental leaching liquid at one stage, to the main leaching liquid first mentioned above. Of course the material produced or separated by the various steps of the process may be collected, washed and used continuously where made available.

After the sulphide iron ore has been converted into the readily soluble form as more particularly explained in the patent the above described leaching and electrolytic treatment can be carried out. It has already been frequently proposed to treat copper and zinc ores or their smelted products in a similar manner. The known processes involving this treatment are, however, totally unsuitable for the present purpose, because, when extracting iron, quite other conditions exist, which render necessary a treatment essentially different from these processes.

In the Patent the method is described in the following manner:

"For carrying the new process into practice, two cases must be considered: (1) When the raw material contains valuable metals which it is desired to extract as by-products. This case is to be regarded as the normal one. (2) When the raw material contains no such metals.

Separation of Iron and Other Metals

"The following is an example of the manner in which the present invention may be carried into effect. The raw material, reduced to a suitable size, is treated at a temperature of about 40 deg. to 80 deg. C. with a dilute, non-oxidizing acid, preferably hydrochloric acid. Assuming that the latter acid be employed, the result of the reaction is the formation of ferrous chloride and sulphuretted hydrogen, in accordance with the well known equation:

$$FeS + 2HCl = FeCl_2 + H_2S \quad (1)$$

"Other sulphur containing metals possibly present, as well as a small residue of gangue, remain behind in the lixiviating apparatus. These particular metals, being in this highly concentrated form, can subsequently be very advantageously treated. The solution of ferrous chloride is electrolyzed in suitable decomposition or electrolytic cells with insoluble anodes, these cells being however of extremely simple construction because the solution contains only one single metal. A portion of the iron is now deposited, while twice this amount of iron is converted into the corresponding ferric compound, as the following equation shows:

$$3FeCl_2 = Fe + 2FeCl_3 \quad (2)$$

Separation of Sulphur and Regeneration of Acid

"The ferric chloride obtained is now passed, together with the equivalent quantity of sulphuretted hydrogen evolved in accordance with equation (1), into an absorption tower or other suitable, similar apparatus, the following known reaction then occurring:

$$2FeCl_3 + H_2S = 2FeCl_2 + 2HCl + S \quad (3)$$

"The acid previously combined with the electrolytically deposited iron is in this manner again liberated in order to be available for further use, while the corresponding quantity of sulphur, simultaneously separated, needs only to be removed and converted by known methods into one of the commercial forms.

"By this process there are therefore extracted in a simple manner not only the electrolytically deposited iron but also the corresponding quantity of sulphur. The valuable metals remain behind as compounds with sulphur and can be recovered by a separate process. The acid employed as solvent is continually regenerated, and then re-employed.

"A special advantage of this process is that sulphur is eliminated in a separate apparatus and is not rendered impure by the residues when the raw material is dissolved. An added advantage is that the electrolyzing devices can be of extremely simple construction, as it is a question of keeping several different metals separate from one another.

"In the above-stated second case, viz. when the sulphide of iron contains no other valuable metals or at least no sufficient quantities to warrant recovery, the above described process may obviously be also employed. Under some circumstances it is, however, preferable somewhat to modify the process, for, since no valuable attendant metals need to be taken into consideration, *it would be possible directly to lixiviate the sulphide of iron with the ferric solution directly obtained from the electrolytic or decomposition cells* (*) For this purpose, however, a certain quantity of free acid must be present, and as the solution to be electrolyzed should contain no free acid, or at least no material quantity, the acid must be neutralized or saturated before the solution is subjected to electrolysis. This again would mean a continual increase of the quantity of solution and a corresponding loss of acid and iron. This disadvantage can, however, be obviated by supplying only a portion of the ferric solution directly to the lixiviating apparatus, while the remainder is passed through the absorption tower provided in case No. 1, in order to reach the lixiviating apparatus only at some later time. In this manner the necessary quantity of free acid is supplied and as this should be neutralized, the quantity of sulphuretted hydrogen necessary to furnish this acid is produced.

"By the process described in this invention it is therefore made possible to produce electrolytic iron from ores and smelted products which have hitherto been regarded as almost worthless. Moreover, the new process is applicable to any sulphide containing smelter product, provided that the percentage of soluble sulphide of iron is sufficiently high.

"As this invention is not limited in its application to one product only, it is of no consequence that the iron is obtained in a crude form as "electrolytic crude iron." The decomposition cells can on that account be of very simple construction. As no free acid is present, and no destructive gas is evolved at the anodes, the cells are well preserved.

"The separated iron is preferably melted in an electric furnace, this iron being alloyed smoultaneously if desired with other metals for special purposes."

(*) The italics show the words of the Estelle patent that correspond with the second equation of the "Estelle Process" mention above.

Electrolytic Reduction of Iron Oxides

The above described invention relates to the utilization of sulphide iron ores. The author also carried out another electrolytic treatment for reducing iron from its ordinary oxide ores. This invention was made a short time before the war and an application for letters-patent was filed for it in November 1914. The American Patent, published on August 6th, 1918, has the number 1,275,161. The Canadian Patent is No. 188,462, Jan. 28th, 1918.

The invention proposes the production of iron by the electrolytic dissociation of a hot slimy precipitate of iron hydroxide suspended in an electrolyte of caustic alkali, comprising for example 35 per cent water, 35 per cent caustic soda and 30 per cent ferric hydrate, the electrodes being of iron, nickel or any other suitable material that resists the effect of the current and of the hot electrolyte. By the action of the electric current metallic iron is precipitated on the cathode in form of a smooth layer, and oxygen is evolved near the anode, while the iron hydroxide is gradually decomposed. In order to render the process continuous, iron hydroxide may be added to the electrolyte in the electrolyzing tank in proportion as metallic iron is precipitated.

Under the influence of the current two events occur. By the action of so-called electrophoresis the hydroxide of iron comes up near the cathode and would firmly adhere to it in this chemical state, if the electrolyte were not simultaneously decomposed. On the other hand the electrolysis would end in a simple decomposition of water, if the hydroxide of iron were not reaching the cathode. The sodium-ions arriving at the cathode immediately reduce the ferric oxide and insure that only metallic iron is deposited at the cathode, whereas the hydroxyl-ions deposited at the anode dissociate into elementary oxygen and water.

The electro-chemistry of the process may be shown by the following equations:

$$6NaOH + 6(F) = 6Na' + 6OH'$$
$$6\ Na' + 2Fe(OH)_3 = 2Fe + 6NaOH + 6(+)$$
$$6OH' = 3O + 3H_2O + 6(-)$$

$$6NaOH + 2Fe(OH)_3 + 6(F) = 2Fe + 3O + 3H_2O + 6NaOH$$

From the final equation it is clearly seen that, by the action of the current—6 valence charges (F) for 2 Mol. $Fe(OH)_3$—the electrolyte, the caustic soda, remains unchanged in its chemical state and only the ferric oxide is decomposed into its elements, iron and oxygen, whereas the water of hydration separates unchanged. By the latter, it is true, the electrolyte becomes diluted, but, the electrolysis occurring at about 100 deg. C., a temperature far below the boiling point (140 deg.) of the electrolyte, there is so much water evaporating as steam with the oxygen that commonly an equalization is obtained by this means.

Process Electrolytic, not Galvanic

With regard to the above description, the reduction of iron is not to be looked upon as the result of a common, galvanic process, but as that of an electrolytic reduction. To prove this statement, an experiment may serve, in which the cathode was separated from the hydroxide of iron by a porous cell. In that case no iron was deposited and the result of the electrolyzing was only a decomposition of water. The process is therefore to be considered as unique in electro-chemistry in this regard also, that a molecule by aid of electrical energy is separated into its constituents parts in such a way that neither of them has an opportunity of forming new combinations and both therefore can be utilized in their unchanged state.

The fact that the electrolyte consists of a strong solution of a caustic alkali has the great advantage of permitting metallic iron to be used as the material of construction, not only for the decomposition-cells themselves, but also for piping, heating apparatus, devices for moving the slimey mixture and for other parts coming into contact with the hot electrolyte. The decomposition-cells therefore can be made air-tight, and for that reason the oxygen also can be caught and utilized. For one metric ton of iron obtained not less than about 300 cubic meters of oxygen are produced.

No Diaphragms Required

The electrolysis occurs without making use of diaphragms. The electric current required is 1.6 to 1.8 Volt at a current density of 3 Amp. per sq. dm. At an efficiency of current of about 90 per cent, the consumption of energy is about 2,800 K.W.H. per metric ton of iron.

The deposited metal does not incline to a lumpy formation as is the case with the ordinary galvanic process. However, it is a little more porous than ordinary electrolytic iron.

Molding, Rolling and Forging Electrolytic Iron Without Fusion

It is simple to provide for an easy separation of the metal form the cathode sheets, if it is to be utilized as "electrolytic crude iron" or as powdery iron. Having not been red hot, the iron may in a simple way be ground to a fine powder. This peculiarity of his iron suggested to the author the idea of a process for the production of objects of pure iron, iron alloys, simple and alloyed steel by making use of powdery materials, by making at first in quite a special way, a solid compressed mass, free from oxygen, which can be worked up by common, well-known methods either cold or red-hot. The objects made in such a way, such as hollow cylinders, which are to be slit and rolled, may accordingly be finished without any melting of the material. This is of great importance, specially for products of excellent magnetic qualities, as the iron, as is known, tends to absorb gases when fused, but not when only red hot. The possibility of giving a certain shape during the compressing of the powdery materials has in itself an importance that is not to be undervalued.

As mentioned, the oxide of iron that is to be electrolyzed must be in a hydrated form. Anhydrides, as hematite and magnetite, may therefore be hydrated by a suitable treatment with ordinary or caustic soda, by which means a ferrite of sodium is first produced, which is then decomposed by the addition of water into hydroxide of iron and caustic soda. So the soda is not consumed; at best it is causticised in accordance with the following equations:

$$Fe_2O_3 + 2NaOH = Na_2Fe_2O_4 + H_2O$$
$$Fe_2O_3 + Na_2CO_3 = Na_2Fe_2O_4 + CO_2$$
$$Na_2Fe_2O_4 + 3H_2O = 2Fe(OH)_3 + 2NaOH$$

Sources of Raw Material for Estelle Process

In many factories by-products are formed, which if not made impure by carelessness may be directly utilized for the present purpose, such as iron hydrates obtained in factories for aniline and for compounds of bromine. Turnings also may serve as raw material for the production of electrolytic iron by this method, after a preliminary washing and conversion into hydrates.

Whether natural products as common iron ores, residues from the purification of bauxite in the alumina factories, and sulphide iron ores (pyrite and pyrrhotite), should be used as raw material, is in any single case a question only

of separation or concentration. With magnetite as raw material an oxygen compound of iron, practically free from gangue, may be obtained economically as is well known. Sulphide of iron can be freed from the gangue by a variety of pyritic smelting, and from sulphur to a sufficient extent by roasting and in other ways. For the treatment of pyrite and pyrrhotite, containing besides iron other useful metals such as copper, nickel and cobalt, and also precious metals (Canadian ores especially), the method opens up new ways, which may lead to the ultilization not alone of the above-mentioned metals but also of the iron, as well as of the sulphur. Non-magnetic iron ores, in the first place the hydrated ones (brown hematite, bog ore, etc.) are hard to concentrate, so that they are less suitable raw materials for the electrolytic reduction of iron than the above mentioned ores. In the treatment in question it is most important that no considerable quantity of gangue should enter the apparatus. Lately, the author has succeeded in finding out a treatment for bringing such ores in a way other than roasting to a very strong magnetic state. This gives him promise of making also of these non-magnetic ores suitable raw materials for his process.

Suggested Uses for Oxygen

Regarding the utilization of the oxygen produced as a by-product in the alkaline process of electrolytically reducing iron, we must mention some special uses. In smelting works the oxygen is not only highly serviceable for autogenous welding and cutting, but also for purely metallurgical purposes. If, for example, in the Siemens-Martin process it were possible to increase the content of oxygen in the compressed air by about 2 per cent., a temperature could be reached, that would permit refining processes that otherwise can be carried on only in the electric furnace. It is only during short periods, that the air must be thus rich in oxygen.

For the utilization of the nitrogen of the air, as in the process with electric arcs, cheap oxygen is of importance as has been shown, since the yield is improved by using the so-called ideal gas mixture, consisting of equal volumes of oxygen and nitrogen, instead of the air. It may also be an advantage to have cheap oxygen at one's disposal, when oxidizing ammonia to nitric acid.

Finally the writer wishes to draw attention to the fact that in the supply of electric current, large fluctuations have no significant influence on the quality of the iron separated. For this reason an industry based on the alkaline process of reducing iron electrically seems to be suited to serve as a consumption-regulator for electric central stations.

This electrolytic iron industry undoubtedly would be able to fulfil the principal conditions of commercial success without any difficulty, the raw material, as a rule, being nearly everywhere obtainable. The finished product, if cheap enough, would find an unlimited sale, and the plant itself would need relatively few hands.

Recent Development in Lightning River Gold Area

By R. E. HORE

The Lightning River gold area is in Ontario close to the Quebec boundary. It lies immediately south of Lake Abitibi and is most easily reached from La Reine station on the main line of the Transcontinental Railway east of Cochrane. La Reine is on a river running into Lake Abitibi from the north east.

The Canadian Mining Syndicate, which is developing claims in the area, has provided a motor boat service to Lightning River landing. From La Reine to the landing is a journey of three and a half hours by motor boat. A very reasonable charge is made for passengers and freight. The present center of activity is about three miles from the landing. A roadway has been cut out to the Syndicate's camp which is on the Meridian line in Holloway township. From this camp trails lead to the other parts of the area. At the landing there is accommodation for travellers at the "Ghost Range Inn".

In crossing Lake Abitibi there is in plain view a number of prominent hills south of the lake. The most conspicuous of these is the Ghost Range. The recent discoveries are just south of this range of hills. The road from the landing avoids the hills and can be made a good one at reasonable cost.

The show place is the Seagar claim, where some very rich ore has been taken out from a quartz vein. The enclosing rock is a gray carbonated mass which is in many places heavily impregnated with iron pyrites. For a considerable distance from this rich vein there is mineralized rock in which ore bodies may be found by stripping and sampling of the undecomposed rock. This is a big task and will take some time, but the chances of finding something of first rate value are good and well worth the effort. Strippings in the vicinity of the vein all show gold in the decomposed rock when tested by panning.

In the neighborhood there are outcrops that show there are wide and strong schist zones running across several claims. The rocks of the area are of types prominent in other Ontario gold areas. Systematic and thorough prospecting is quite likely to give good results and it is pleasing to note that preparations are being made by several groups of claim owners for intensive prospecting. Already a lot of good work has been done and the encouraging results have resulted in the erection of permanent camps for the continuation of the work.

A few miles south of the Seager claim is the Willans-Howie-Cochenour property, a description of which was published some time ago in the reports of the Ontario Department of Mines. Mr. Cyril W. Knight described in some detail the formation there and called attention to the number of lava flows that occur. In the vicinity of the new discovery outcrops of sedimentary rocks—greywacke and conglomerate—are more prominent than the volcanic rocks. At the O'Neil claim there has been stripped for several hundred feet a mineralized red porphyry dyke which is in basalt. The rock enclosing the rich ore on the Seager property appears to be largely composed of secondary minerals. It has been formed probably by alteration of a mass of igneous rock; but microscopic examination will be required to determine its exact composition and probable origin. Mr. Knight has recently visited the new discoveries and his report will probably include some detailed description of the rocks. A geological map of the area would be of considerable assistance to prospectors.

As the season for water transportation is drawing to a close, the provision of a winter route is now occupying the attention of the operators in the area. It is probably that roads leading out from the T. & N. O. Ry. at Matheson or Ramore will be extended to serve as winter roads. Camps for winter use have been erected on the Seager, O'Neil and Cryderman claims and it is evidently the intention to proceed with exploration without delay. Prospectors have recently staked out a number of claims and there will doubtless be a great deal more staking during the next few months.

Red Lake District of Patricia

SURVEY MADE IN 1893 BY DR. DOWLING

Much interest is being taken in the recently reported discovery of silver on Red lake, Patricia district, Ontario. A geological survey of Red lake was made by D. B. Dowling of the Geological Survey of Canada, in 1893. The following notes are taken from Mr Dowling's report.

Red lake is a long narrow body of water dotted with innumerable islands and branching into a great number of elongated bays. Its greatest length measured in a west south-west direction is 27 miles, and its greatest breadth at right angles to this is 7 miles.

The geological formations exposed on the shores of Red lake are Precambrian in age. They consist of a series of schists, limestones and bedded volcanics, designated at that time as Huronian in age. These were intruded by later granites.

Pipestone bay, the most westerly bay of the lake, affords the best opportunity of studying an almost continuous exposure of the older schists, limestones and volcanics, across the strike. "It was found to present, with Front Bay to the south, a series of highly inclined beds representing possibly many folds which have assumed the general form of an anticline, the axis running east-and-west occupying the area of Pipestone Bay. The beds on the north, in contact with the gneiss, dip northward at angles varying from 60 deg. to 80 deg. At the centre and near the south side they are nearly vertical. Southward through the narrows, the inclination is south varying from 50 deg. to 80 deg. from the horizontal. A synclinal fold with its axis running north-west brings the beds up again on the south shore of Front Bay, where they strike along the general direction of the south shore of this arm. The continuation of this to the south-east probably form a narrow belt passing near Medicine Stone Lake and joining the same rocks at Gull Rock Lake.

"The composition of the series in these folds appears to be as follows, in ascending order:—

1. Dark green schists, probably squeezed volcanic material, together with a more crystalline hornblende-rock which appears to be eruptive.

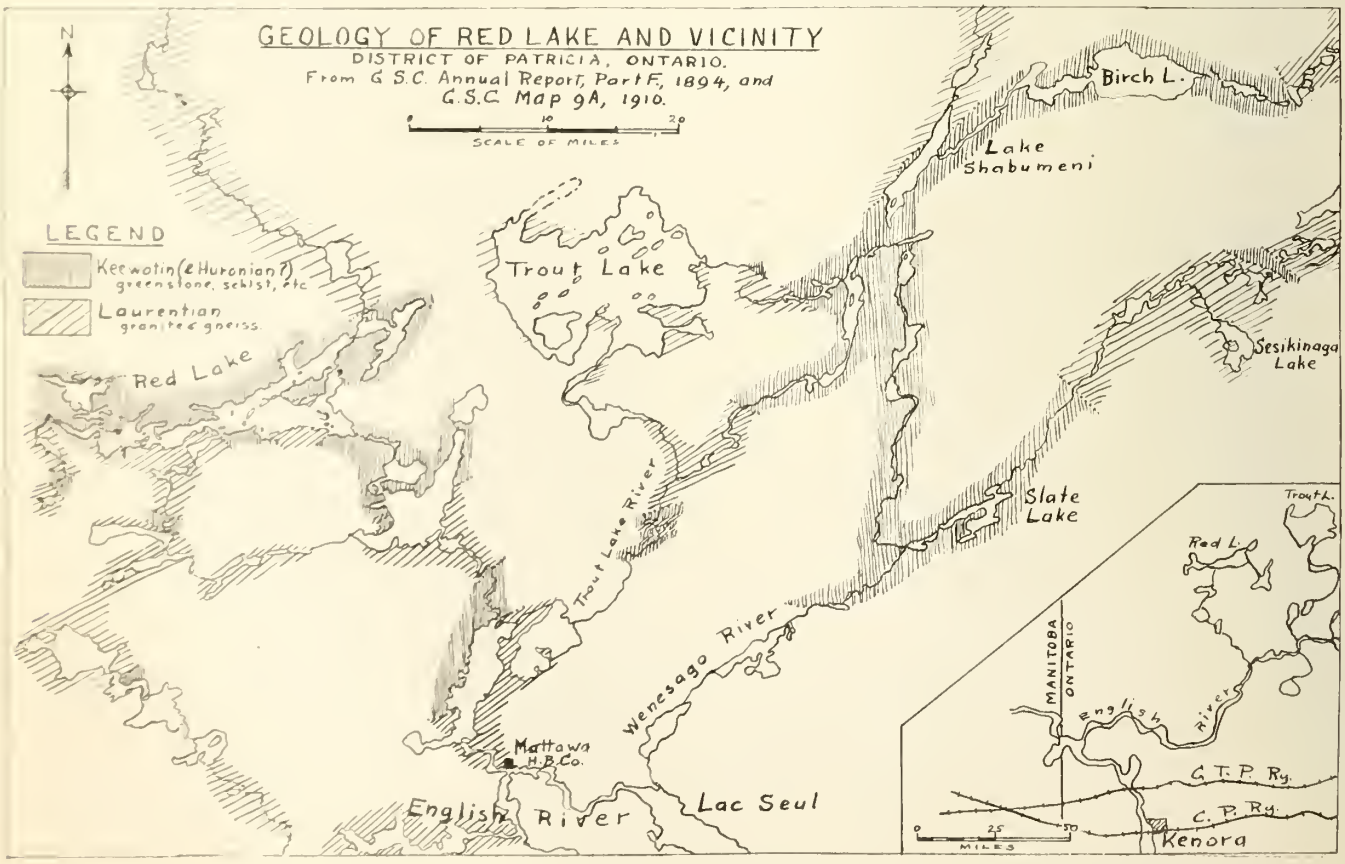
2. Yellowish-white, rusty-weathering, dolomitic limestone, holding irregular nodules of a cherty nature. These beds in some places are more or less quartzose owing to the greater or less prevalence of the cherty masses. Alternating with them are greenstones which are occasionally altered to a soft chlorite or pot-stone, the pipe-stone of the Indians. In this form, an example is found in the narrows leading to Pipestone Bay, where a bed of one foot in thickness lies between beds of rusty dolomite.

3. Beds of slate and schist, mostly black and dark-green, are found to intervene between the first rusty beds and a second series above.

4. The second series of rusty-weathering dolomites is preceded by a bed of squeezed and altered quartz-porphry of ten feet in thickness. The dolomite is in a thicker bed, and, like the first, very much spotted with dark-weathering irregular masses of cherty or quartzose material.

"Above this is another band of altered quartz-porphry, which is in the form of a gray hornstone with numerous blebs of quartz.

"In other parts of the section, these beds can be with difficulty followed, but may become altered to varieties of slates, schists and quartzites, while layers of greenstone, perhaps of volcanic origin, are found interstratified or



forming lenticular masses between the beds, often seemingly occupying the place of other members of the section.

"The beds crossing the central portion of Pipestone Bay, possibly representing the lower members of the series, are nearly altogether of alternate layers of greenstone and green schists, often becoming a chlorite schist. Succeeding them to the north, a series of highly quartzose felsites, occupying probably a similar position to the lower dolomites of the south side, weather to light colours and assume the appearance of quartzites.

"In the northward extension, which should represent the upper part of the section, the first band of altered quartz-porphyries and cherty dolomites only, are found in contact with a band of dark diorites and hornblende-rocks, which extends to the contact with the Laurentian.

"In a bay just north of the Wolf Narrows, a band having the appearance of a conglomerate is found, with occasional pebbles of red banded jasper and others of a light-yellowish quartzite, but the majority of the pebbles are of a dark purplish gray to green with a matrix of the same colour. The thickness of the band is about ten feet, and the associated rock is of a greenish to gray colour in rather thin beds. The position of this bed is probably represented by a band of conglomerate, which follows north of the slates exposed on the north side of Slate Bay. These slates, a fine grained argillite in composition, are generally black and thin bedded, with many jointage planes dividing them into small pieces less than a foot in length.

"At the eastern end of the lake, dark blue limestones are found associated with these beds, but as the strata there are apparently much folded, the relations of the two classes of rock could not be ascertained.

"The rocks on the south shore of Granite Bay, as well as the points on the north, are all of a light reddish granite in which the foliation is very slight. Wherever noted, this is nearly parallel to the general line of the northern border, dipping towards it at a low angle.

"The line of contact of the Huronian schists is seen in many places, beginning on the west at the narrows from Trout Bay, where it cuts off two small islands lying in front of the opening. Thence it crosses Marble Bay, and the beds on the point to the east are cut at an angle of 45 deg. by the granite, which occupies the point and also the western face of a small round island where the schists abont directly on it. The large island to the south is mainly granite, with only the slender point at the east end, of Huronian. At the Wolf Narrows, both shores are granite, the line of contact following nearly the line of bedding of the schists, and cuts off the northern point. In the bay to the east the granite has been eroded to the contact line, and along the shore small patches of it are found clinging to the face of a high cliff, while seams of the same material occur, running north into the mass of the darker rocks. This shore is thus chiefly composed of Huronian rocks, but generally represented by a dark crystalline rock which looks somewhat like a diorite squeezed in some places to a crystalline schist.

"The granite of the south shore is replaced at the Middle Narrows by black schists and dark green rocks which strike south by east, apparently the same beds which border the north shore of the bay to the east. The contact line bends around from the north shore, touching the islands, and strikes the south shore just south of the narrows. There the contact is a sharp line running with the strike, but having a few parallel dykes of granite, apparently filling breaks made along the bedding near the contact. A few scattered dark angular fragments are seen in the granite.

"The rocks of Marble Bay, on the north, are continuations of the altered quartz-porphyry and rusty cherty bed which is seen directly to the west. These are followed to the north-east by fine-grained light-green altered rocks and by a small area of white calcite with many dark irregular markings which are very similar to those in the yellow beds before mentioned. This area of white marble-like rock does not seem to form a well defined bed, but looks rather like an irregular mass. At the end of the bay, dark crystalline rock is seen, altered to a serpentine or something of that nature.

"The eastern part of the lake is divided into two parts by a string of islands, with a large one, Mackenzie Island, at the north end. The northern part forms a long narrow arm running to the north-east and is named Slate Bay, from the many exposures of this rock running parallel to the north shore, and also exposed on the north shore of Mackenzie Island. The slate band of the north shore is found to be flanked on both sides by agglomerate. That on the south side is a dark-green mass, in which large lumps of slightly harder rock are cemented together by material similar in colour, but weathering somewhat more readily. Fractures along the bedding show a very lumpy surface. This bed may prove to be of volcanic origin, and it was recognized in two places, on a point at the west end of the bay and on another opposite Mackenzie Island.

"On the northern edge of the slate band, a narrow strip of lighter coloured slate, holding lumps or grains of quartz, was found. The possibility that this is a much squeezed and altered quartz-porphyry, is suggested not only by its appearance, but from the position it seems to occupy in the section, where it is apparently a continuation of the bed seen on Marble Bay. This is followed northward by a bed of argillaceous slate, making a total breadth for the slate bands of nearly a quarter of a mile.

"A band of cherty rocks, holding pebbles of much the same nature, occurs at the north side of a bay near the west end, and again appears north of the slates, in a deep bay northward from the centre of Mackenzie Island. Still farther north, after passing some dykes of fine grained diorite, similar pebbly rocks are cut by granite dykes, which are apparently offshoots from a mass that seems to compose the hills at a short distance north of this arm.

"On the north end of Mackenzie Island and on the mainland to the east, dark blue limestones are found associated with dark schists. These rocks strike to the south of east on Mackenzie Island, but northwest this changes gradually, till in the narrows leading to Whitefish Bay, they are running north-east and parallel to those on the north side. They seem to form a broad curved band coming from East Bay and abutting on the schists and slates of Slate Bay. In the narrows above, the rocks are fine-grained, black schists, and in East Bay the principal rock seems to be a dark green schist, which maintains a nearly uniform strike of south-east by south. On the west shore are dark greenish-blue limestones, followed by yellow rusty weathering cherty dolomites or limestones, which are probable continuations of some of the limestone beds of Mackenzie Island. The attitude of these is generally vertical, but occasionally they dip to the west. On the eastern shore of East Bay several large dyke-like masses of granite, generally light-gray, cut the beds, and probably indicate the proximity of the granite which occupies the shores of Trout Lake to the east.

"The northern point of Mackenzie Island shows beds evidently very much disturbed. Their strikes converge on a point just west of the island, dipping on the north at a high angle to the north, to the south of this point toward

the south, and lastly, along the western shore, they dip to the west, apparently passing under the slates exposed on the west side of the island. The position of the dark-blue limestones would appear to be lower in the series than the slates though as there is possibly a great dislocation as well as folding, this is uncertain.

"The bay to the south, or near the outlet of the lakes, is found to have been eroded through the centre of an oval area of intrusive granite, which occupies a part of the south shore, several small islands in the middle, parts of islands near the outlet and the southern part of Mackenzie Island. The contact with the Huronian on all sides shows the intrusive nature of this granite mass.

"The schists on the south strike approximately parallel to the contact, following around the granite, while on the east and north the beds are more broken up and have been replaced by the granite. Part of the beds which pass to the south do not reappear on the west, and are evidently broken off. The main mass of the rocks of the south shore, west of the granite, are black hornblende-schists and eruptives, and these beds are seen again at the outlet and thence at Keg Lake, but a series of fine-grained greenish-gray, thinly laminated, chlorite schists, with lenticular patches and thin partings of calcite, lie to the north. These end at the granite, appearing only on its eastern side."

News of Mining

Great Britain

Labour conditions in the coal mining industry showed some improvement during July as compared with the month of June. The average number of days worked was larger and the coal production greater. The total output for the four weeks ending June 24th was 15,826,800 tons; whilst that for the four weeks ended July 22nd was 18,145,300 tons.

The Report of the Fuel Research Board for the year 1920-1921, contains the statement that fuel oil derived from the low temperature carbonization of coal is completely immiscible with ordinary fuel oils. So far as is now known, Trinidad oil is the only one with which it will mix freely.

From the famous "Blue John" mine, near Buxton, from a depth of 300 feet, wireless messages were recently sent to the village of Hope, some miles distant. This is the first recorded trial of the wireless underground.

United States

In a paper read before the Lake Superior Mining Institute, Mr. F. W. Denton adduced some extremely interesting and encouraging facts. Certain changes in mining and milling methods at the mines of the Copper Range Company, and the results of these changes, are presented and discussed. The most salient points are:—The general introduction of the one man drill. The completion of the plant for regrinding the coarse sands. The introduction of waste sand for stope filling. A much closer study of underground conditions. —Comparison of the two periods, 1908-1914 (inclusive), and 1915-1921 (inclusive), shows that the effect of these changes was marked. The improvement is best seen in the increase of extraction of copper from 24.8 lb. per ton in the former period, to an extraction of 37.2 lb. per ton during the second period. The tons stamped per shift per head for all employees was 2.01 tons and the yield of copper 48 lb. during the former period; during the latter, the corresponding figures were, 1.91 tons and 71 lb. copper. Extraction is now above 85 per cent. and the concentrating ratio 30 to 1.

Feldspar mined and sold in the United States during 1921 fell off 32 per cent. in tonnage and 27 per cent. in value as compared with the output of the year 1920. The average value of all crude feldspar sold was $6.62 per long ton. Ground feldspar sold at an average price of $17.91 per ton. Prices for the ground ranged as high as $26 per ton. The total tonnage produced was (crude) 91,865 tons. North Carolina was the largest producer, the output of that State being 40,712 tons.

On the 30th of August a labour union official named Otis Clark was indicted and immediately arrested on the order of the Grand Jury now sitting at Marison, Ill., investigating the Herrin massacre. Clark is charged with complicity in the Herrin murders. The State authorities have refused to release him under bond, Illinois miners' unions are strenuously attempting to spread the idea that the move was inspired by "capital". The Illinois Chamber of Commerce has been actively engaged in raising funds to meet the expenses of the investigation.

Europe

At Noeux-les-Mines, France, a demonstration plant erected by the Minerals Separation, Limited, has successfully treated shales, low grade anthracites, and *schlamms* from various parts of the country for the reduction of ash content. A plant with a capacity of 1000 tons per day is now projected to treat the Noeux shales.

Late in June the German Reichstag passed an Act regulating the hours of mine labourers. The Act now covers all kinds of mining. Measurement of underground shifts is made uniform. Maximum hours are fixed as indicted in this column recently. Shifts are shortened in mines where the temperature exceeds 82 degrees Fah.

Both pig iron and steel production increased in Belgium during the month of July as compared with June. July's production or pig iron was 127,220 tons, of steel 111,040 tons. The figures for June were 114,910 tons of pig iron, and 108,870 tons of steel.

The historic Przibram silver mines, Bohemia, have been shut down. About 600 miners will be thrown out of employment.

For the first seven months of the current year Sweden's exports of iron ore amounted to 3,100,000 tons. This compares favorably with the exports for the corresponding period of 1921, when exports were only 2,100,000.

Exports of iron ore from the Lorrain Basin, France, were 4,328,500 tons during the first six months of the year. During the same period of the year 1921 they totalled 2,666,428 tons.

July's production of crude petroleum in Roumania was 140,000 tons.

Africa

The projected blast furnaces and steel plant, to be erected near Pretoria, will be situated on one of the three known large iron ore deposits of South Africa. Another

large body of ore lies within a short distance of the proposed plant. The dolomite to be used as flux will be obtained from huge deposits in the neighbourhood, and the coal from the Witbank seams about 70 miles away.

The net operating profits of the Cape Asbestos Company, Limited, for the year 1921 were £26,532. A dividend of 10 per cent. was recommended by the directors.

The gold mining companies of the Transvaal milled 6,856,647 tons of ore during the first half of 1922. The yield was 2,456,549 ounces of gold, an average of 6.95 dwt to the ton. The working costs aggregated £9,840,345; or 23s. 1d. per ton. Working profits totalled £916,440, or 8s, 6d. per ton.

Australia

A recovery of 95 per cent. of the silver and lead contents in the form of pure merchantable metals, and a complete recovery of zinc in the form of a pure concentrate, is promised to the Zinc Corporation (Broken Hill) by the manufacturers of the new Elmore process plant. A 25-ton trial plant has been shipped from England and will shortly be installed at Broken Hill. If success crowns this trial the effect will be to render available for treatment hundreds of thousands of tons of old dump material not now commercially treatable. It is claimed that Elmore process costs are remarkably low.

The resumption of work at Mount Morgan has brought about a marked increase in the mineral output of the State of Queensland for the second quarter of 1922. Official returns give the value as £129,844. In 1921 the output was valued at only £53,985. Copper produced at Mount Margan during the Quarter was valued at £92,595.

The ore treated during 1921 at the plant of the Great Boulder Proprietary Gold Mines, Limited, totalled 94,051 tons, yielding 90,131 ounces of gold. The ore averaged 15.08 dwt. per ton. Mining and milling costs averaged 45s. 11d. per ton, an increase of 4s. 2d. per ton as compared with the costs for 1921.

News and Comments

By ALEXANDER GRAY

The Engineer Mine

The speed with which rumor becomes positive statement is illustrated in the matter of the examination of the Engineer Mine, in British Columbia on behalf of Messrs. Timmins. As originally announced in *The Canadian Mining Journal*, the Messrs. Timmins took an option, knowing the property is involved in litigation. All negotiations were subject to the examination of the mine and a clear title. Mr. Alphonse Paré, as stated at the time, is familiar with the White Horse Pass and tributary country. He was delegated to make the examination. While en route, however, he became ill, dangerously so. Notwithstanding this, he reached the mine, and that is about all. He could not do more than make a hurried inspection, and even that accentuated his ailment. So he was hurried out to a steamer, brought south and to Montreal, was operated on, and is rapidly convalescing. Meanwhile, W. P. Alderson, who happened to be in Alaska for Thomson-Doheny interests, was requisitioned. Mr. Alderson, therefore, has been making the examination. No doubt conditional terms have been arranged, but everything depends upon the Alderson report and the final decision by the Privy Council.

Quick Work at Continental

For the August 15 September 15 period, Manager Hussey reports progress amounting to 150 feet. According to this, the three compartment shaft on the Colonial property at Cobalt is going down at a rate approaching the record. Mr. Hussey holds one record for shaft sinking at the Witwatersrand, and it seems he is craving others in the Northland. Moreover, the aggressiveness with which the work is proceeding bespeaks more than need be conveyed in words as to the earnestness of the Continental Mines management. On September 23 the Continental Colonial shaft was down 20 feet. At that rate, if it is maintained, the contact sought may be reached early in February.

Nipissing Makes Hay and Sunshine

Another three per cent. regular and three extra from the Nipissing softens the asperities of other share markets. So there are mines giving dividend performances for almost two decades. Besides, the Nipissing Company has a liquid treasury position, in cash and bullion, representing most of its capital liabilities. Yet the ore reserves are perennially valued on a nominal basis—just enough to make it look pleasant before the camera.

Give "High-Graders" the Longest "Holiday"

The arrest of gold "high-graders" and the recovery of a McIntyre gold ingot in Italy, should be followed by the punishment of the thieves. No light sentences will suffice. The limit of the law is necessary, and then there will have to be renewed vigilance in order to minimize thefts of this sort. How much silver was purloined from shipping silver mines (so easy was it to grab what really was bullion) is beyond conjecture. Change houses and close supervision did not prevent thievery, and thievery that was organized. Rarely have the culprits been brought to book. Crooks there always will be. Ontario silver ores aroused cupidity. Thieves are resourceful, nor are they confined to Ontario. It was the stealing of diamonds that resulted in the perfection of legislation to make it punishable to have an uncut stone in your possession without a Magistrate's permit setting forth the source of the diamond. Even then it was known that thefts were numerous, but five years on the Breakwater with hard labor was a deterrent, and "I. D. B." —Illicit Diamond Buying—became less of a commercial proposition. So much gold in the form of amalgam was stolen at the Rand, off the plates, or wherever it could be obtained, that it became a felony to have unwrought gold that could not be explained away. Five years for "I. G. B." Illicit Gold Buying had remedial effects. Of course screens on the plates and various other devices prevented thievery to some extent, but we have just seen the evidence that illicit traffic has been continuous and extensive. Porcupine and Kirkland Lake companies were victimized, and the Government should give the crooks the limit.

Premier Mine a Star Performer

There must be heart burnings among those who were faint hearted about what now is known as the Premier Gold Mining Company of the Portland Canal District. Another dividend has been declared, the latest being for

15 per cent. As this is the fourth dividend since the tramway to the property was completed, bringing the total of distributions within a year to $2,400,000, the private owners are to be felicited upon having been repaid nearly one-half of their investment. Production is going on at about $400,000 per month and the rate of dividend emphasizes what the grade of ore must be. Evidently the results are sufficient incentive for the broader activities of the chief owners, who have been acquiring other properties.

"Ontario's Gold Output"

Under this caption *The Globe* of Toronto, editorially rises to the occasion and vigorously remarks:

> "Pressing world conditions should stimulate the owners of Ontario gold mines to develop every prospect that looks as if it might become a mine, and to expand the production from every profitable producer."

Incidentally *The Globe* discussed at length the disadvantage under which debtor, war-stricken, impoverished nations are laboring, because they are unable to attract gold, which they need for the purposes of international commerce. As the United States has 40 per cent. of the world's gold lying inactive, "useless", in the Washington vaults, and as gold production is waning everywhere but in Canada, *The Globe* would have Ontario mineowners do more than seems to be possible unless the obligation to do this very thing is shared by the more influential Canadians who have the necessary funds. To "develop every prospect" with the surplus monies earned by producing companies, might not be the most practical and remunerative method of accomplishing what *The Globe* so forcefully advocates.

That *The Globe* has always exercised a wholesome influence upon the Ontario mining situation, cannot be questioned. It has not seen eye-to-eye with mineowners at all times. Perhaps it could have been more constructively critical betimes, and thereby further the cause of Mining Industrialism; yet the spirit has been willing if the flesh was weak, and the very fact that it now urges a broader forward movement is a most auspicious event. "Every prospect" to which the term "prospect" can be justly applied, it would have entertained by owners of producing mines, and by having "production from every profitable producer" expanded, a larger measure of relief for the world's needs would be assured. Gold, Ontario Gold, *The Globe* would have us believe, can be distributed in volume —$20,000,000 this year; $30,000,000 next year, and $50,000,000 in due course.

Gratifying as it is to have this editorial optimism, and reassuring as it is to have so much confidence displayed by an influential daily newspaper, the proposal is susceptible of abuse; for it would be injudicious to impose upon the directorates of "profitable producers" the risks involved in the way suggested. Reproductive speculative investments in the manner proposed might have an effect contrary to that intended by *The Globe*. There are multiplying indications that Directors of dividend-earning mines are most enterprising in endeavoring to prolong the lives of their mines. Hollinger Consolidated has acquired the Schumacher; the Dome Mines took over Dome Extension and may not stop at that; McIntyre added the Pearl Lake, Jupiter and others, including the so-called "Schumacher Veteran" Claim. Thus we have the three leading Porcupine producers practically demonstrating their readiness to carry on. Several "Domelets" were merged. Porcupine Crown and Vipond-North Thompson-Krist plans are in the melting pot.

Eligible "prospects that look as if," are not confined to those herein named; but the average owner of undeveloped ground looks rather askance when he considers the possibility of his precious parcel of land being subordinated to anything else. Invariably the vendor's stipulation is for independent organization—part cash and a large helping of script. Except in special circumstances no "profitable producer" cares to dilute his solids with "prospects" too fluid for other than water ballast.

Frequently, unproductive, somewhat unproved areas, are not beyond the scope of what *The Globe* has in mind; but to amalgamate them with other non-producers and make it a patriotic duty for profit-winners to finance such ventures, might lead to a kind of dissipation certain to result in the alienation of popular interest and the diversion of funds that belong by right to those for whom directors are trustees.

No doubt *The Globe* intended to have the prosperous miner succor the deserving prospector. That is as it should be, if the drain upon trust funds is not too great. The safer, saner policy is to have such journals as *The Globe,* appreciating the potentialities of the Ontario gold fields, point out that "prospects" that are merely presumptive mines and are capitalized as full-fledged mines are thus made unavailable for the purposes of "profitable producers" who must not scatter their surpluses indiscriminately. Regardless of well-grounded optimism actual producers are too few. Were there co-operation rather than the lack of it, combined areas might be explored and proved, but not altogether by those who are outputting and making profits—profits that belong to shareholders in the respective companies.

The practice recommended by *The Globe,* and practised at other fields, inevitably is toward the acquisition of the more desirable areas by the successful mining corporations. If daily journals will do as *The Globe* does to some extent, that is to discriminate and educate, and thereby enlist outside capital otherwise than through the medium of share-selling agencies then production will reflect the real merits of the North Country, where gold occurrences are so widespread that they require more capital than mining exchanges can provide. The larger stock exchanges and men of affairs, even the bankers, will have to abandon their policy of aloofness before all that *The Globe* portrays is given effect and Ontario is established as Canada's golden province. Meanwhile "profitable producers" are the standards of credit.

Never losing sight of all *The Globe* has done for the welfare of the Ontario mining industry, it is in order for that journal to render the "profitable producers" a distinct service by inducing the Government at Ottawa to take the hobbles off by permitting urgently needed metal mining labor to enter Canada. Of late there has been a noticeable slackening of efficiency and there is somewhat of a shortage of unskilled labor. Ottawa has drawn the line on immigration and failed to understand the difference between essential and non-essential labor. If production is to expand and if plans to that end are to be consummated, there will have to be a slight relaxation of labor regulations. Gold miners are getting a good wage. There are not quite enough of them. *The Globe,* having stated the case for production, can do more by exerting its excellent offices with Ottawa.

Optimism Pervades McIntyre

Being the deepest mine at the moment in the Porcupine Field, and confidently assuming that it will "be able to operate at the lowest level of any property", as the daily press quote President Bickell, there is substantial basis for the optimism voiced by General Manager R. J. Ennis at the annual meeting. According to Mr. Ennis, not only

have the net profits for the first quarter of the current fiscal year been at the rate of approximately $100,000 per month, which compares with an average of $70,000 throughout 1921-22, but the new ore bodies located in the lower section "pointed to the possibility and even likelihood of continued values at increasing depth."

"All the characteristics" of these veins, Mr. Ennis declared, are favorable to vertical continuity and sustained values, hence the deduction registered by Mr. Bickell that "we believe the ore on this property is very deep-seated and will give greater permanence to our mine." Of course that is obvious, and the fact that ore opened up on "the 1875-ft. level for a distance of 800 feet" has "averaged $20 a ton", with every prospect of further lateral extent, provides an indicated factor warranting the belief that development "will put a great deal of ore of fine grade in sight."

With one shaft at 2,100 feet and lateral work proceeding at depths only slightly less, the diamond drill and detailed development no doubt have pointed the way toward operations at greater depth. President Bickell stated that "the head of the main shaft is being prepared and strengthened to enable sinking to proceed to a depth of 5,000 feet if deemed advisable. To a certainty "the outlook for the company is more encouraging than ever before."

Immediate plans involve modification of milling and metallurgical practice, by which it is expected to increase production to 1,000 tons a day, or double last year's tonnage capacity. Like other producers, McIntyre has to make dividends more in keeping with market capitalizations; therefore it is intended to put through more ore from the lower levels "rather than treat the carbonaceous ore in the upper levels." Moreover, the lower levels' grade is better. So with it and the larger tonnage to be treated, earnings will be in closer harmony with the market position. "To this end," said Mr. Bickell, "new equipment is being installed and will be ready in 60 days, when it is expected to increase the average daily tons milled from 750 to 1,000."

To have the President of the Company supported by his General Manager, and both of them "on their toes", so to speak, regarding the McIntyre structure, should give courage to the camp as a whole. Preparing to go to 5,000 feet, "if advisable", opens a new chapter. That is a matter to be dealt with as the years go by. Meanwhile the Schumacher Veteran Claim is to be tested by diamond drill. Already $25,000 has been paid for a six months option that is renewable for a further three months on payment of $25,000 more. In the event of the results being favorable, the purchase price all told is to be $400,000, spread over four years. Those terms appear to be reasonable enough and the acreage is a consideration, if ore bearing.

With reference to the Blue Diamond Coal Company subsidiary, the prospects are represented to be "distinctly promising". Amicable adjustment of labor difficulties permit of production at from 10 to 12 cents per ton less than heretofore. "The company's labor is now unionized and production is gradually being restored to normal. Output at the present time is approximately 1,500 tons a day, and it is anticipated that within three months' production will have been extended to 2,000 tons. All through the coal strike when the majority of United States plants were closed down tight, this company operated at fifty per cent capacity."

The story as told at the McIntyre meeting is complimentary to the men who made it possible to tell it. Competent management and properties that survived their original mismanagement, have given the company a deservedly prominent place in the ranks of producing gold mines. Most of the shares are held in the United States, and shareholders can be assured of the good-will interest of all Canadians.

Economic Position of The Metals

Lead at a better price than it has brought in two years; zinc "imperceptibly higher," as the chroniclers of the press put it, accompanied by heavy trading, makes producers of those metals fairly contented. Copper at 14 cents, and the disconcerting element injected into the labor market by increases in the wage of steel-workers, leaves the red metal somewhat stormbound. Were international metal markets broad and active and exchange nearer to normal, the action of steel corporations in advancing wages might be less bothersome. Unfortunately there is a shortage of unskilled labor, and the skilled has not quite completed its lesson; so steel makers had no other recourse. The copper producers are not complacent. The tendency toward inflation before international business is possible, has its admonitory aspect.

MORE SAFETY WORK

That we shall see in the immediate future a greater development of public safety work together with a campaign against industrial accidents carried on with even greater activity through organized effort, is the statement of Marens A. Dow, General Safety Agent of the New York Central Lines, newly elected president of the National Safety Council at the eleventh annual congress held at Detroit August 28 September 1.

In accepting the leadership of the Council for the new year Mr. Dow said further that every effort would be made in the forthcoming year to reduce the national loss of life from industrial and public accidents which last year totaled approximately 80,000 deaths.

"The saftey movement has long since passed the reform stage," said Mr. Dow. "It is now a practical, constructive movement. While much has been accomplished in lessening accident casualties in industry, much still remains to be done. We are cutting down industrial accidents and now must work for a great development of public safety without neglecting industrial safety work. The right to work and mingle in public places without injury is the right of every citizen of this country. The National Safety Council is pledged to promote a national spirit which will make the recognition of that right paramount in the minds of the people."

Practical application of a process for extracting oil from the tar sand deposits of Fort McMurray, has now been made, it is said, with a plant, installed by a company operating in that vicinity. The bed being worked is 150 feet thick.

The diamond is one of the most enduring of minerals. In washing for gold, it may turn up with such hard, heavy minerals as garnet, zircon, and magnetite. Valuable diamonds have been found in this way by the watchful prospector and miner. It is not enough to find a mineral that will scratch glass; quartz will do that. But the diamond easily cuts into quartz. There is a mistaken notion that it cannot be broken with a hammer, and several large diamonds have been destroyed by that test. The diamond passes through an ordinary fire unharmed

The Mining Districts

BY THE JOURNAL'S CORRESPONDENTS

MAKING NEW MINES AT PORCUPINE

By R. E. HORE

During the past few months there has been a marked increase in mining activity in the Porcupine gold area. The success being met with at the Hollinger, McIntyre and Dome has resulted in determined efforts being made to locate similar ore deposits on the neighboring properties, which for some years have remained undeveloped because their value has been more difficult to determine. Early efforts at exploration of these properties did not give satisfactory results. Now, however, the attack is being vigorously renewed. With the added knowledge gained by several years of work on the producing properties, the operators now have much greater chances of success. Important results may confidently be expected from some of the work now under way. The probability of extending the producing gold area has already been greatly strengthened by the results of work done during the past few months.

Goldale

A Porcupine gold mining operation that is likely to attract much attention from now on is that of Goldale Mines Ltd. This Company recently began underground work on one of its several properties in the gold area and having sunk a shaft to a depth of 500 ft. is now ready for a thorough testing of the ore-zone at that depth. The ore-zone has been delimited by surface work and diamond drilling and is known to have most promising possibilities. The actual opening up of the ground is likely to give momentous results. Systematic drifting and crosscutting will be carried on rapidly and there is good reason to expect that a large body of ore will be opened up at this level during the next few months.

The work at the Goldale mine is being carried on by the Kerr Lake Mining Co., Ltd., which has acquired a large interest in Goldale Mines Ltd. Exceptionally good progress has been made in sinking the shaft and the work has been done well and in a way that will facilitate the operations now beginning at the 500-ft. level. There is every evidence of intention to proceed rapidly with the development. There is evidence also of confidence in the outcome, for the shaft work obviously has been done with a view to use for production as well as for exploration. Mr. Harry Kee, who is in charge of operations at the Goldale, evidently expects to hoist a lot of ore out of this shaft. The chances are good that he will.

There is exposed on the Goldale property a very promising ore-zone. This zone is made up of mineralized schisted rocks enclosing gold-bearing quartz veins. Along the zone are small outcrops of quartz porphyry. This ore-zone crosses diagonally through the Goldale property and is of such length and width as to make Goldale a large mine if any appreciable part of it is of payable grade.

Newray

Northeast of the Goldale is the Newray property, which is now being explored by Coniagas Mines, Ltd. The Newray has been idle for some time, but in the early days of Porcupine it was regarded as a valuable property. From the discovery vein about a quarter of a million dollars in gold was recovered. Comparatively little exploration of the vein was carried on after the outcropping ore-shoot was mined out. It is quite reasonable to expect that there are other ore-shoots in the same zone. Coniagas is now exploring the property with diamond drills. At present one hole is being driven in the southwestern claim and another has been started from close to the south boundary east of the Newray road. This new hole dips to the north under some promising surface showings. The other hole now being drilled dips to the south. The Newray has great possibilities and the tracing of the ore-zone across the property by diamond drilling will doubtless be followed by underground operations as soon as power is available.

Holtyrex

West of the Newray is the Holtyrex property on which important work has been done this summer. Trenching in the south-eastern part of the Holtyrex resulted in the discovery of some rich ore in rocks typical of the ore-zones of the area. A considerable amount of stripping has been done and the ground is now being cleared for shaft sinking and for construction of buildings.

Rochester

Close to the Hollinger an interesting development is under way at the Rochester property. This Company is sinking a shaft close to the railway. A good start has been made, but progress has been slow recently owing to the large amount of water encountered. An unsatisfactory supply of power also has handicapped the operators.

NORTHWESTERN ONTARIO

The Longworth Silver Strike

As the recent discovery of silver near Schreiber, by William Longworth, becomes opened up, its interest increases. The vein is two feet in width at surface, and is traceable for one and one-half miles. It has been uncovered by stripping and trenching for a distance of 12 chains from the point of discovery. The silver is in the felsite on the east wall of the vein, and occurs native, in leaf and nugget form, in quantity that runs into high values. There is a three-inch streak of massive galena in the centre of the vein that assays from 34 to 70 ounces of silver per ton, and from $2.70 to $4.60 per ton in gold. Visible gold occurs in an eight-inch vein of quartz on the west, or hanging wall.

Development work is proceeding by way of an open cut along the vein. This cut is now in 24 feet, and is 15 feet deep. The vein is well defined between good walls, and has widened at the north end, at the bottom of the cut, to three and one-half feet.

Mr. P. E. Hopkins, geologist, of the Department of Mines, Toronto, writes that he will be up next week to make an examination of this property.

C. E. Kingsley, E.M., of Toronto, examined this find during the past week. While there he put in some shots and took away several pounds of samples carrying native silver.

Humphrey W. Chadbourne, E.M., of New York, representing the Gould interests, is due in Schreiber on Oc-

tober 8th, to make an examination of the McKellar-Longworth property, with a view to becoming interested with the present holders of the option.

The Jackson Gold Mines, Limited, are engaged in erecting a complete set of working camps, preparatory to carrying out extensive development work at an early date.

Option on Claim near Schreiber

Lewis Fenning, of New York, representing New York interests closed an option today, on fourteen claims in the Schreiber area lying between the McKellar-Longworth property on the south, and the Jackson Gold Mines, Limited, on the north, for an unstated figure. The option involves working conditions, that, if carried out, will result in the development of these properties in the immediate future.

Mr. Fenning is a mining engineer, and is just back from the Schreiber field after examining the claims included in the option.

The Re-open Silver Mines

The Islet Exploration Company, Limited, have taken a working option on a number of the old silver mines located south-west of Port Arthur, along the Duluth extension of the Canadian National Railway. These include the East End Silver Mountain, West End Silver Mountain, Badger, Porcupine, and others all famous in their day as producers of the white metal. It is the intention to thoroughly open up and explore these properties for further silver deposits, more than one of which is already known to exist. It is confidently believed that the application of modern methods of recovery will enable the operators to again place these mines on the map as producers.—J. J. O'Connor.

BRITISH COLUMBIA

Cassiar Properties Involved in Lawsuit

The gold-silver properties of the Cassiar District known as the Mad ot Erin, the Wonderful, Sonora, and others are the subject of a lawsuit in which Robert W. Wiley, of Portland Ore., is asking that Richard Kennedy of Haines, Alaska, et al be required to deliver good title or pay him $140,000. Wiley took an option to purchase in January, 1921, the amount involved being $490,000, of which $20,000 was paid at the time. He then proceeded to develop, doing work and installing mine machinery costing $120,000, according to the statement of counsel. On August 1, 1922 an additional $50,000 was to be paid by Wiley but, it is stated, when he called on the vendors to give good title they failed to do so. The documents conveying the properties to Wiley, which had been placed in the Bank of California as provided by the option agreement, were removed. Mr. Wiley now is asking that they be placed in escrow again and good title assured or his investment returned. The difficulties the defendants find themselves in, it is said, is that the heirs to the estate of Patrick Kennedy cannot be found and as their interest in the properties would be approximately $125,000 there at present are obstacles preventing the immediate delivery of good title.

Lardeau Properties being Developed

Michael Sullivan, in co-operation with New York interests, is reported to be opening up the Wagoner and other gold-silver properties of the Lardeau. Hugh McKay is developing the Red Elephant, of the same district, while a twenty-foot vein, carrying gold-silver-copper, has been opened up between the Red Elephant and the Bannockburn Groups.

Slocan Mines

The Silversmith Mines Ltd. are preparing to instal a 200 h.p. Diesel engine as an auxiliary at their compressor plant in order to meet such a possible emergency as a shortage of water or a break in the pipe. In the Ruth Mine, also of the Slocan, a five-inch vein of clean silver-lead ore has been uncovered. The Rambler-Cariboo is making regular shipments again. There are between 150 and 175 men engaged in mining operations in the vicinity of the town of Sandon. Over four hundred now are said to be similarly employed in the whole of the Slocan District.

Silver-lead Ore at Windermere

The Windermere, East Kootenay, is the scene of renewed mining activity, largely due to the work being done on the Steele Group of Mineral Claims, situated between 18 and 19 miles from Brisco. This property carries a fine-grained galena ore which, when sorted for shipment, will run between 30 and 40 ounces in silver and from 65 to 75 per cent. lead. These are conservative estimates. The owners are the Alice Arm Holdings Co., of Vancouver. An aerial tramway, 1,500 feet long, is being installed and A. J. Hughes, the superintendent, expects to continue shipments all winter. Near this mine are two other mineral groups, viz., the Lead Queen and the Isaac, both of which are promising, the ore being of much the same character as that of the Steele. Development is in progress in both instances. The Paradise Mine at Lake Windermere and the Monarch at Field are the only other mines shipping from this district.

Cedar Creek

While the Cedar Creek excitement of six months ago has petered out to a large extent, there still are many prospectors in that part of the Cariboo. The latest report is that rich ground has been found at Quesnel Dam. This is one of the centres at which miners outfitted en route to the interior. The story is that good pay was discovered in excavating behind the hotel. As a result all the ground in this locality now is staked. Some difficulty is being experienced because of the lack of water, but good returns are said to have been obtained. Messrs. King and Ramser, who are hydraulicking, state that their ground is on the old Cedar Creek Channel and that bedrock has been reached with every indication of satisfactory clean-ups.

Gold Quartz in Fraser Valley near Hope

A. S. Williamson reports that three quartz vein outcroppings have been located on Hills Bar Creek, near Hope. Some samples have been taken running high in gold. The property has been examined by representatives of three of the largest mining corporations of United States, including the U. S. Smelting and Refining Co., and the Anaconda Copper Co. Where Hills Bar Creek flows into the Fraser River, large amounts of gold were mined by the old timers during the excitement of over sixty years ago. That rich quartz veins existed has been a legend of the district for years. They are supposed to have been discovered first by a Chinaman, who passed the information on to prospectors. They searched without success, but the quest has never been entirely abandoned, and the recent find is said to be the legendary deposits.

Geological Parties Returning

The field work of parties of the Canadian Geological Survey in British Columbia is drawing to a close. Dr. G. A. Young, who was engaged in a survey of iron deposits, has left for Ottawa. After some months in the Cariboo where he has been collecting data on the placer fields, Dr. W. E. Uglow has returned to take up his duties as professor of mineralogy at the British Columbia University. A. C. E. Shepherd, D.L.S. who has been in charge of a party on Vancouver Island working under the topographical division of the Surveys Branch, is expected back shortly. Dr. Victor Dolmage and party are on their way south after mapping near the Alaskan boundary. Mr. J. E. Walker has returned east after spending the season in the Cranbrook District on geological work. Dr. George Hanson will be back from the Northern Interior very soon, and Dr. J. D. MacKenzie is expected to complete his work on Vancouver Island in a few days. He has been engaged on an investigation of the coalfields of the Island.

Gold Quartz Find in Windermere

Larrabee Brothers are reported to have opened up some rich quartz claims on McDonald Creek, Windermere District. The showings are being developed and the owners are confident that their find will prove important.

Ore Receipts at Trail

Ore receipts at the Trail Smelter for the second week of September, amount to 6,268 tons, made up as follows: Alamo, Alamo, 46; Blue Bell, Riondal, 8; Noble Five, Sandon, 43; Paradise, Lake Windermere, 41; Quilp, Republic, 267; Republic, Republic, 50; Surprise, Republic, 53; Silversmith Sandon, 31; Revenge, Beaverdell, 11; Standard, Silverton, 130; Whitewater, Retallack, 34; company mines, 5554.

Business Men Visit Portland Canal

Grant Mahood, President of the American Mining and Milling Co. has taken a party of Vancouver business men on an excursion to Stewart, B.C., the object of which is an inspection of the Company's property, the Fish Creek mine. The excursionists will also visit the Premier Mine while in the North.

Granby Company Bond Copper Property near Stewart

The Granby Consolidated Mining and Smelting Co., it is announced, have bonded the George Copper property, which consists of 20 claims situated on the south side of the Bear River, some 20 miles from tidewater at Stewart. It is stated that extensive diamond drilling is planned for next year. Mr. George Clothier, Government Engineer, in his report of 1918 said that the "blue vein" on the George group is comprised of three veins contained in a 50-foot mineralized belt, traceable for a thousand feet or more; the veins, aggregating 10 ft. of ore, average gold $4.00, silver 30c. per ton, copper 3 per cent. After describing what are termed the "white vein" and the "green vein", he says that the property appears to improve with exploration and should receive more extensive investigation.

Records for B. C. Coal Mines

Consideration of the coal mining returns for the past few months indicates that some records have been made in production. The Western Fuel Corporation of Canada during the month of August had an output of 85,000 tons. As far as is known this is the greatest monthly output to the credit of the company since it began coal mining on the Island. The average production for a month is 56,000 tons. The Canadian Collieries (Dunsmuir) Ltd. also has improved its showing remarkably. At the beginning of the year this company's monthly figures dropped to around 26,554 tons. They have been coming back steadily, the production for August being some 48,000 tons. The Nanoose Wellington Collieries had a production in August of 10,315 tons, the best record yet made by that corporation. Leaving the Island, it is found that the same activity prevails in the Nicola-Princeton coalfield. The Coalmont Collieries, for instance, jumped their production to 18,059 tons last month, their record to date. The Middlesboro Collieries, too, had an output of 9,500 tons, which compares more than favorably with past showings.

The total production of the Province for this year to date approximates 1,600,000 tons, which is an exceptionally fine record when it is remembered that the collieries of the Crow's Nest were closed down through strike trouble from the latter part of the month of March to the 28th of August last. If production continues at the present rate for the remainder of the year there should not be much of a decline in the provincial output for 1922 as compared with that of 1921 notwithstanding the Fernie trouble, and the loss it represents in coal to British Columbia.

NOVA SCOTIA

A Resolution

"Whereas the wage rates of the Sydney agreement has ben accepted by a majority vote of the rank and file of the miners of District 26, U. M. W. of A., under the lash of hunger, military despotism, together with threats of the provincial government to man the mines with provincial constables armed with guns, clubs and full authority of the law, to intimidate, browbeat and shoot the strikers into submission; and

"Whereas the brass check press together with the entire pimp and spy army always employed by the operators, did advertise, circulate and threaten the eviction of the miners from all company houses by an army of armed provincial police, in order to further intimidate the miners to accept the poisoned starvation wage rates; and

"Whereas the international union could not or would not render us any assistance to further carry on our fight against this sort of tyranny and unmerciful onslaught on our already too low standard of living; and

"Whereas we, the members of local 4529, feel thoroughly convinced that such circumstances compelled the majority of the miners of Nova Scotia to vote for the cessation of the fight at the time of the referendum; and

"Whereas we proclaim that any agreement obtained by force, threat or fraud is neither legally or morally binding, or cannot be interpreted as a settlement of our wage dispute.

"Be it therefore resolved that we demand of the executive board that they refuse to sign the said Sydney agreement in its present form either for eighteen months or any period of time until the said agreement is submitted to the international board for its approval."

The above resolution is a fair sample of the regular output of the Phalen Local, the largest local in Nova Scotia. It seems that a quarrel is on between this local and International Board member Barrett and J. S. Lewis, President. The resolution is a tissue of misrepresentation from beginning to end and no man is better

qualified to see this than President Lewis, who will repudiate it. He will no doubt tell this local that it has failed to carry out his instructions during the strike by refusing to save the collieries from being flooded, and they can now carry out the wishes of the rank and file, who voted for the agreement, and sign up as soon as possible.

As to eviction, etc., this is absolutely a false statement and is without any grounds. If there was intimidation it was on the part of the striking miners, who held up everybody and everything that they thought would interfere with their plans.

The agreement will be signed irrespective of Phalen local. The other locals are tired of all this unnecessary agitation and are in a mood to tell the members of Phalen to mind their own business.

Local Dissatisfaction over Agreement

When the Nova Scotia miners learned that work was to be resumed in the American collieries at the 1920 rates, there were those who began to talk loudly about the bad settlement effected by their leaders. This was further accentuated when it became known that the Alberta miners had agreed to return to work on a fifteen per cent. reduction pending the settlement in the United States. Without taking time to think the matter over, a few malcontents began to claim that they were badly treated. International Board Member Barrett lent color to their belief when on returning from the United States he criticised the making of any agreement under the 1920 rates. Workingmen can be excused for not being able at all times to think logically, as they have not always a clear view of all sides of their case; but when a leading officer attempts to mislead them, he is not doing it in the best interest of the industry or of the men he pretends to lead. Having on more than one occasion been forced to defend his action and give a reason for the faith that was in him, Mr. Barrett has stated again and again that during the war period the miners of Nova Scotia had received much larger increases than the American miners. This being so, why does he now make comparisons that places them in an unfavorable light? Is it because of his interest in the miners or because he sees an opportunity again to become popular by criticising others and stirring up strife? No one knows better than he does that the Nova Scotian and American miners are going back on the same basis. The McKinnon Award came into force at the collieries in 1920. The American miners received an increase in the same year, but none since then. But in 1921 the miners of Nova Scotia received a further increase of wages. The parties to the agreement recognized this and when the 1920 wage rates were accepted, where was the injustice to the miner workers of Nova Scotia? It does seem that if the mine workers are to work contentedly it can only be when they know that they have kept pace with their fellow workmen in the United States, with whom they have linked up to advance their moral and material interests. What Mr. Barrett "would work the miners to" may not be apparent to all; but even the casual observer can see mischief afoot in his recent criticisms.

Miners now Well Paid

With steady employment the miners of Nova Scotia at present rates will be able to make fair wages. This is freely admitted and will tend to greater harmony. But if it should happen that we may not be able to fully wrest the Quebec market from the Americans and push our coal further west, then we may find ourselves stalemated and the whole industry will suffer from the effect of arrested growth. Indeed it is from this cause that we have suffered most within the last year. Special efforts were made last spring to win back lost trade, and while for a time it appeared that we had fully succeeded, a sudden change in the American situation upset all calculations and may, if we are not careful, throw us back again to old conditions. There is no doubt, however, that Nova Scotian coal will find a growing market in the territory lost during the war; but if the profits made are such that it will not encourage the opening up of new collieries, then the industry will not make the progress demanded of it.

Nova Scotian Coal More Expensive than American Coal

If the miners of Nova Scotia could be made to see that American coal mining conditions to a very large extent govern our Canadian industry, a long step forward in finding a remedy would be made. Until they see that American competition limits their earnings and determines their standard of living, they will not be in a position to take advantage of the place they should occupy as feeders of the eastern coal trade. With hearty co-operation, within a very short time employment all the year round might be made general in the mines of the whole province. But in order to procure this, miners should be taught to understand the coal industry of their Province as it is related to that of their competitors in the United States. Whether or not we unite in an international labor organization to advance the interests of miners, we cannot overlook the fact that certain American coal fields, because of the favourable position of their coal seams, their quality, their thickness, their depth, their dip and their level in a country with a fairly equitable climate, have advantages that cannot be set aside by any artificial regulation. Providence has so willed it, and man cannot alter the conditions.

Herbert Hoover's Diagnosis

This feature of the coal problem has been forced upon the public notice in the United States in a way that may lead to a practical solution of their, and our own mining problems. Speaking to the Salesmen's Association of the American Chemical Industry in New York, Herbert Hoover, Secretary of Commerce, declared that he did not believe that great solutions of labor difficulties are to be found in emotional denunciation, but in sober scientific examination. "When the public can be made the victim of infinite loss and suffering by such disagreements as we have witnessed, when the whole nation can, once every two or three years or less, be pushed to the edge of the precipice of want and commercial collapse, when our public utilities, hospitals, schools and kitchens are dependent upon short rations of non-union coal, when the federal government is forced to interfere with business and transportation to secure even this movement to essential points; when hundreds of thousands of workers not only in the industry but outside of it are thrown into skimping and starving when the nation is made to suffer the shame of Herrin and rampart crime that has followed a train of strikes then some examination of our industrial sanity is called for." The speaker pointed out that there were two distinctive problems for which constructive solutions were needed employer-employee relationship and economic reorganization of the industry. "Labor," he said, "is struggling to set up remuneration based on such day's pay and such piece work rates as give 50 per cent. of the

employed. Labor is thus honey-combed with the worst of stimulants to unrest—insecurity of employment. At the same time men who have the opportunity to work full time in regularly operating mines earn returns far above the average income of our most prosperous farmers and other workers. There can be no solution either to the operators or to the workers so long as this condition continues."

Canada, which imports more coal from the United States than is produced at her collieries, is largely dependent upon the conditions here described. With the exception of the coal mines of Western British Columbia, which, because of an agreement based on a sliding scale, continued to work throughout the strike period, all Canadian collieries were for some time shut down. There are no non-union mines in Canada as in the United States and no source of coal supply in case of a strike. If the National Coal Commission of the United States succeeds in finding a solution of the problem in hand, Canada stands to benefit as well.

Other countries, such as Australia, have been working on the lines suggested by Mr. Hoover, and to some extent have been able to regulate their industries by moderating the fierce conflict of competition. To do this the American Commission has a big job on hand, and the closing up of 40 per cent. of the bituminous coal mines may be beyond their power. To determine the number of miners that must be shut down in any locality and the number of miners that must seek employment outside of the coal mining industry in a country where restraint of trade is forbidden except by the labor organizations, and to make recommendations looking to the prevention of labor disputes or at least keeping them within reasonable control is, as Mr. Hoover says, the duty imposed on this Commission by a people weary of idiotic warfare and futile attempts at solution. Mr. Hoover agrees that no solution is to be found in arbitration.

Sliding Scale of Wages

The sliding scale of British Columbia is interesting as an experiment and strikes us as the better way of adjusting wages. As we understand it, wages are adjusted on the cost of living principle. This is a new departure from the sliding scale principle as first worked out in Great Britain when wages went up and down with the market price of the commodity. A basis of agreement is necessary in either case. When once this is laid down adjustments are not difficult. It does seem, however, that no permanence can be attached to any system of wage settlement that recognizes only one side of the question. During the war the cost of living was given by all labor leaders as one of reasons why wages should be increased. When the cost of living began to fall after the war, labor leaders especially those of Nova Scotia openly stated that the cost of living had nothing to do with wages. On the other hand operators claimed that wages must be based on the ability of the industry to pay wages. There is, no doubt, a certain amount of truth in the argument of each; but somewhere between the working out of these two principles should be found a basis of adjusting all labor disputes. It might be unnecessary to return to a monthly or even a three months adjustment of wages; but when market prices are fairly steady throughout the year, it might be possible to make agreements on the basis of the past year's cost of living and prices received for the commodity or articles sold. There are, we know, a large number of those whose work is that of transportation, etc. who are not producers; but having a basis of settlement for the basic industries, all others would naturally follow.

A COURSE IN INDUSTRIAL METALLOGRAPHY

Under the auspices of the department of Metallurgy at McGill University an extension course in Metallography will be given as in previous years, by Messrs. Harold. J. Roast F. C. S., F. C. I. C., and Charles F. Pascoe F. C. I. C. The student need have no previous knowledge of the subject.

The course consists of fifteen periods, held on Monday nights at the Chemistry and Mining building McGill University, commencing on Monday November the sixth at 8 P. M.

Application should be made to either of the lecturers, their address being McGill University, department of Metallurgy.

The fee for the course is $20.00 payable to the Bursar.

In as much as only twelve members can be accomodated at one time students will be enrolled in order of their applications.

In past years the class has been composed of mechanics, engineers, chemists, and those desiring a winter hobby, or whose business brings them in contact with metals and who desire to have more knowledge of their composition. NO PREVIOUS KNOWLEDGE IS ASSUMED and the course is essentially practical from first to last.

If any students from a previous year desire to continue their work provision will be made for an advanced course if sufficient members are obtained.

Ferrous and non-ferrous metals are dealt with equally, training being given in preparing them for examination under the microscope and finally photographing the various structures developed.

PROFESSIONAL ENGINEERS OF ONTARIO

The organization for Registration of Professional Engineers under the Act passed at the last session of the Legislature, has been completed, and today the Association has opened a permanent office at 96 King St. West, Toronto Brig. Gen. C. H. Mitchell is President, and Mr. Robert A. Bryce, Vice President of the Provisional Council, which comprises representatives of each of the five branches Civil, Mechanical, Electrical, Chemical and Mining. Mr. R. B. Wolsey has been appointed Registrar and Secretary Treasurer.

The reconstruction of Britannia Beach is advancing rapidly. The concrete work for the new mill is almost completed and a start has been made on the steel erection for the fireproof mill building. Considerable machinery, including cranes, hoists and concentrating and screening machinery has arrived and the rest of the plant is expected shortly. Mill construction should be completed about the end of the year. When the new mill is in full operation Britannia will be the largest producer of copper in the British Empire with an output fo abont 40,000,000 ponnds of copper per annum.

The largest cargo of steel products ever shipped to the Antipodes cleared from Sydney, Nova Scotia, on September 20 for Australia and New Zealand, with 2,200 tons of the output of the Dominion Steel plant on board.

It is reported that a 3,000,000-feet flow of gas has been struck at Barnwell, near Taber, by the Calgary Gas Company. A flow of gas was also struck during the past week at Vauxhall, on the farm of the Otis-Staples Company near Medicine Hat.

EDITORIAL

The channel chiefly used by the promoter to reach the public is the newspaper advertisement... The majority of schemes to which the public are invited, by the advertising method, to subscribe, may be regarded with suspicion. — *J. C. Gwillim* — 1907

GENUINE AND COUNTERFEIT

In mining promotions, as well as in all other varieties of promotion and in most other businesses, there are varieties that range all the way from the *bona fide* investment to the downright swindle. In the mining field, examples of the latter are constantly before our eyes, particularly in the daily press, whereas the former is still so rarely found consorting with the less reputable undertakings on those pages that an actual occurrence is well worthy of remark.

When making the original announcement of the incorporation and operations of Continental Mines some weeks ago, the *Canadian Mining Journal* intimated that those back of the undertaking would probably give an opportunity to the public to participate, to a small extent at the very least, in what is considered a very promising mining venture. This has been done.

Simultaneously in New York and Toronto there was offered to the public last week 250,000 shares of Continental stock out of a total of 700,000 shares. The company already owns twenty-seven claims at Kirkland Lake and the Colonial property at Cobalt. These were acquired privately by the New York mining men responsible for the organization of Continental Mines. The brokers to whom the public issue of stock has been entrusted state unequivocally that when this stock shall have been sold, there will be over a million dollars in the treasury, as well as 80,000 shares of stock unissued and available for the purposes of the company. The financial position of Continental Mines needs no comment. It is well in accord with the financial ability and the personal reputations of the men who grace the company's board of directors.

Alongside the dignified announcement of this issue of Continental shares, and attempting to simulate the conviction of confidence in the venture that radiates from it, are myriad advertisements of stock in gold mines in the same golden north country. We need not particularise. Suffice it to say that, so far as we have observed, not one of these advertisements offers stock on which there is more than a remote chance of drawing dividends, and a number of them approach very closely or even cross the line where the untruths they insinuate, if they do not state them, are subject to process of law. As usual, the host of parasites in human form are taking eager advantage of the "gold boom" to separate the unwary and their loose change—and the daily newspapers and the Royal Mails are the chief agents they employ for the purpose.

It is very hard, if not impossible, for the uninitiate to distinguish between the genuine and the counterfeit opportunity for investment in mines. The investing public have still a great deal to learn about the mining industry.

INSTITUTE MEMBERSHIP

At the meeting next month in Vancouver of the Canadian Institute of Mining and Metallurgy, "Institute Policy" is to be, once more, a subject of debate and, doubtless of very lively debate. The Secretary, Mr. G. C. MacKenzie, will, presumably, uphold his stand for an Institute of widely inclusive membership, representative of every phase of the mining industry and working for the advancement of the industry by every legitimate means. Mr. H. G. Nichols and Mr. T. A. Rickard, who also are to address the meeting, have shown a decided preference for an exclusively technical society, whose prime object it is to promote the interests of its members first, and by this means to forward the interests of the mining industry as a whole. Last year, the Western branch of the Institute was solidly in favour of the technical society. We hope that this year there will be sufficient difference of opinion to provide for a well rounded discussion of this most important question.

Whatever the conclusion may be as to the Institute's policy on membership, there is a related question that has been almost completely neglected by the Institute up to the present. The Institute has never adopted any policy of self regulation such as would tend to give its members a professional status in the public eye. Now that the mining engineers of Ontario have, at their own request, been excluded from the provisions of the Professional Engineers Act of Ontario, and since in the other provinces a large, if not the larger, part of the mining engineers are opposed to this form of regulation, it is incumbent upon them all to provide some other form of regulation that will attain the end desired by all without including what some may regard as unnecessary and impossible structure.

If the mining engineers of this Dominion are to be a coherent body, influential and respected as is their due

they must make it plain, to themselves and to all the world, that they are subject to the self-regulation and discipline which alone can promote unity of purpose and of action. If those involved in such an attempt at co-operation are a heterogeneous lot, the effort is foredoomed to failure; they must be men whose object in life is, in the main, the same. Hence we can assume safely that it will never be possible for the whole Institute as at present composed, and much less with the addition of the larger numbers it is proposed to enrol as members, to undertake and fulfil the regulation of professional mining engineering practice that now is so urgently required in Canada. Only a carefully selected body of mining engineers can fulfil that purpose.

How can this object be accomplished? We are convinced that the object of the founders of our Institute, as recorded both in the words of the constitution they framed and in their subsequent actions, intended that it should represent the mining industry as a whole, and not merely that fraction of its personnel now known as accredited mining engineers. The fact is that when the Institute was founded there was no clearly marked class of mining engineers, as there is today. Formal education in mining engineering had barely commenced, and mining men were of necessity drawn from all walks of life. We are satisfied also that the instinct of these founders of our Institute was sound, and that today we should have an Institute including all those whose professional activities, and even hobbies, give them an interest in the products of mine and quarry. A membership thus extensive is bound to include many who are not interested in, and indeed actively opposed to, the imposing of regulations, with which the professional engineer alone is primarily concerned.

There is a means at hand, conveniently and immediately, whereby professional regulation of mining engineers throughout Canada can be effected, without recourse to restrictive legislation and without altering the character of our Institute in such a way as would destroy, in large measure, its present usefulness. For some time past our Secretary and Council have been enrolling Professional Members of the Institute. The credentials of applicants are scrutinized very carefully, and where necessary private and pains-taking inquiry is made as to the professional status and the character of the applicant. Here there is, already enrolled and with fees already paid (we hope!), the very Society that numbers of our Institute members desire. It remains but to get together, as the Professional Mining Engineers of Canada, and to "get busy." So far as we can see, there is nothing in the constitution of the Institute to prevent a section within it working for a specific object that is supplementary to, though distinct from, the object of the Institute as a whole. How such a sectionalizing of the Institute would effect its activities, it is difficult to predict; but it is certain that a society of professional mining engineers outside the Institute would be much less likely to co-operate fully with the remaining units of the industry than would such a society inside the Institute.

It seems fairly certain, from present indications, that the Institute as a whole wishes to retain its present, and original, inclusive membership. We suggest the above means of effecting the end desired by those that would have exclusive membership.

SPECIALISTS IN HIGH-GRADE STEEL

As has been pointed out more than once in these columns, if Canada is to have an indigenous iron and steel industry, it must rest principally upon some natural resource in which she excels. Only thus can international competition, which is more and more a factor in the operation of national industries, be met successfully. Hence to gauge shrewdly the chances of the success and growth of any branch of the Canadian industry, one must examine the basis of natural resources upon which it rests, as well as the resources of human energy and initiative that will put to use what nature has provided.

At present Canada has no production of iron ore and so it goes without saying that, from the national point of view, our basic production of iron and steel is not only on an insecure foundation, but is such, in central Canada at least, that it cannot hope to compete on equal terms with our neighbours who supply us with the raw materials. It may be that the present case will be improved as time goes on by means of progress in ore-dressing and ferrous metallurgy that will make our ores of iron commercially available. We are confident this will be the outcome of progress now foreshadowed.

In the meantime, there are certain undoubted advantages possessed by our country that can be, and are being, used by some of our iron and steel men. Principal among these is cheap electric power, of growing importance with the increasing demand for high-grade and alloy steels. We are well off for some of the alloying metals, such as nickel and cobalt, though we still import others. Chief among our advantages, though, is the native ability and energy of Canada's sons, without which the best of natural advantages is of little avail.

Elsewhere in this issue we print a short description of the works and products of the Hull Iron and Steel Foundries. A growing proportion of the products of this foundry is composed of the high-grade, specialized materials mentioned above, all of them made in the electric furnace and many of them subjected to special after-treatment. Not only has the best of standard practice been adopted in order to ensure superior quality, but Mr. Coplan has done a considerable amount of original research to good effect. Given correct technique, good workmanship and sound business management, progress depends upon original research and the commercial application of results thus obtained. On this basis we would judge that the Hull Iron and Steel Foundries is in a fair way to expanding, with our growing metal industry, to

proportions more nearly commensurate with Canada's vast territorial extent and her promise of industrial development.

WHO IS RESPONSIBLE?

The disaster by fire in Temiskaming district has shocked us all into the consciousness that there is something radically wrong with conditions that will allow a widespread fire to originate in a settled, or half settled, community. By the irony of fate, this holocaust was timed in the midst of Fire Prevention Week. The suffering throughout the fire swept district has been alleviated so far as is possible. How can a recurrence of this frightful destruction be prevented? Such preventive measures as are possible are a matter of grave concern to the northern mining communities, always subject to the threat of the fire fiend.

There is a series of well conceived regulations for the prevention of forest fires. Were these regulations observed, there would be few fires, if any. Forest fires originate from the non observance of the regulations. Fire rangers are employed at public expense to see that the regulations are observed, and the work of these guardians of the law, ineffective as it may have been in many cases, has in the aggregate prevented a deal of useless and senseless destruction.

On the assumption that the season for fires had passed, the fire rangers were withdrawn, by order of the Department in Toronto, on October 1st. That this assumption is false is shown not only by the present case, but by the periodically recurring instances of an October so dry that it invites conflagration. If the Department of Lands and Forests has allowed economy to interfere with safety, it is culpable. There has been circulated in the daily press the flimsy excuse that the settlers had asked for the withdrawal of the fire rangers on October 1st. Of course they would do this—they want to get along with clearing their land as soon as the crops are off; but such a request is no more reasonable than it would be from a fishing party in midsummer, if the danger of fire remains after October 1st.

We respectfully suggest that the responsibility for the withdrawal of the fire rangers before the danger of fire was past be fully investigated, and that the departmental regulations that authorise such an ill timed move be scrutinised and, if necessary, amended with a view to preventing in the future the recurrence of such a mistake.

EDITORIAL NOTES

We are pleased to note that the voters of The Pas electoral district have come so near to unanimity in the choice of Premier Bracken as their representative in the Manitoba legislature. We might have wished for a miner to represent what is essentially a mining community; but Premier Bracken's record shows him as a man of such wide interests and of such sterling character that we are confident that he will upset all precedent, and will fulfil his pre-election promise to guard and guide the interests of his miner constituents in Manitoba's north-land.

Lightning River is being "boomed" in some quarters in a way that augurs ill for its progress as a genuine centre of mining activity. But the report of Mr. C. W. Knight, which we publish today, provides geological evidence of the district's possibilities as a producer of gold that the boomsters have missed. Mr. Knight's conclusions can be put to the test only by the painstaking and expensive surface exploration and diamond drilling necessary in a region where rock exposures are few and far between and the intervening drift is deep. We hope that his favourable report will stimulate the genuine work of exploration without affording to the unscrupulous an additional means of parting fools and their money — but that is an idle hope!

The Canadian National Railways traverse the larger part of Canada's mineral lands, productive and potentially productive. To such an extent is this the case that it can be only by means of mineral production that the Canadian National Railways will be made to pay. We are pleased to note, as evidence of an active interest in this question and an appreciation of its prime importance, that a pamphlet written by Mr. Price-Green has been published, drawing attention to our mineral resources. This pamphlet is described briefly on another page.

It is certainly more obvious to the mining man than to the layman, however clearly the case may be presented, to what a large extent a modern railway depends upon mineral products for its profitable operation. There is no doubt that Sir Henry Thornton, the newly appointed head of the Canadian National Railways, is conversant, as is the thoughtful miner, with this fact. It will be interesting to note by what means Sir Henry will proceed to put this idea into concrete being.

DAWN—THE METAMORPHOSIS

From out warm blankets, in the heartless dawn,
Without the vaguest chance to stretch or yawn,
Wet socks and boots, and fingers numb with frost,
Your feelings raw, your temper nearly lost
Lo! at his fire the heaven sent cook performs;
And in a trice a dish of coffee warms
Your gelid vitals—Lord, but that was good!
Your grouch evaporated while you stood
With outstretched hand, and eagerly did wait
The heaped up riches of your breakfast plate
Breakfast absorbed, (your slightly loosened belt
Proved it had tasted well as it had smelt)
You saw the dawn, no longer chill and gray,
A golden promise of a glorious day.

J. C. M.

A Modern Alloy Steel Foundry

HULL IRON AND STEEL FOUNDRIES, LIMITED

The present day iron and steel metallurgy of Canada is characterized to a growing extent by commercial establishments peculiarly suited to Canadian conditions. One of our chief assets in building up an indigenous iron and steel industry in Central Canada is, and will continue to be, the availability of cheap electric energy in large quantities. Therefore an iron and steel plant whose operation is based primarily upon this natural resource is likely to endure and prosper. Such an one is the Hull Iron and Steel Foundries, Limited, at Hull, Quebec. This plant has an extensive site beside Hull West station on the Canadian Pacific Railway. It is of thoroughly modern construction and design, and may well serve as an example of the steel foundries that are bound to be built up at various strategic points throughout Canada. Indeed, this movement is already well under way, and will keep on so long as the higher grade of product furnished by a steel foundry, and particularly by an alloy steel foundry, continues to be in growing demand.

Products of the Foundry

The products of the Hull Iron and Steel Foundries are principally plain steel and alloy steel castings for railway and mining use. There are made complete locomotive sets, including frames up to 36 feet in length; car castings and general railway castings; manganese steel guard rails; machine moulded steel gears, up 15 feet in diameter; manganese steel liners and forged balls for ball mills; gyratory crusher heads and liners and crusher jaws of manganese steel; and alloy steel stamp shoes and dies. Besides these there is a rapidly increasing production of a special steel grate bar, which will be described in detail below.

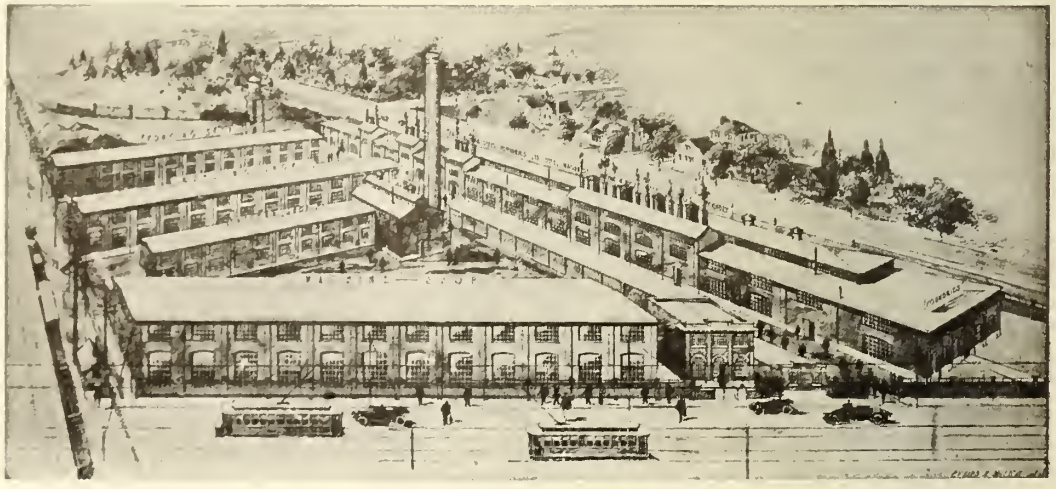
Most of the output of castings consists of plain carbon steel, as is required by the trade. But a growing proportion is of the more durable, though more expensive, alloy steels. Chief among these latter is manganese steel, which has become invaluable for use in crushing machinery and in certain parts of railway equipment since its historic discovery by Sir Robert Hadfield. Chrome-nickel, chrome-vanadium and any other alloy steels are produced as required, but their use is very limited at present. Most of the alloy steel products are subjected to heat treatment to derive the full benefit of their content of the rarer metals.

Heat-Resisting Grate Bars

Mr. Coplan, president and general manager of the Hull Iron and Steel Foundries, has a full measure of that inquiring disposition that leads to research and experiment and thereby to progress and prosperity. After two years of experimental work, he produced a grate bar of heat-resisting alloy steel especially suited to withstand the exacting conditions of the locomotive fire-box. The sample sets of bars originally installed have now been continously in use for 2½ years, are still as good as new and will apparently last indefinitely.

The chemical composition of this useful alloy has been patented in the United States and Canada. The grate bars have been adopted under the regulations of the United States Railways, and an export trade has already been commenced. The steel grate bars are 25 to 40 per cent. lighter than cast-iron bars, and consequently their first cost is only slightly higher. They are, of course, useful in stationary boilers, especially where standard shapes and sizes are required; but where only a small number of a special design are required, the cost of the requisite patterns is a serious consideration.

The present capacity of the plant is 600 tons of castings a month. This is to be increased shortly to 1,000 tons a month.



General View of Plant —Hull Iron and Steel Foundries.

Main Foundry Building

The main building, containing all the principal facilities of the foundry, is 680 feet long and 100 feet wide, of three-bay design. The central part, 50 feet wide, is used for moulding and casting. Across one end are the facilities for making cores. Ranged along the two side bays, each 25 feet wide, are the various other items of foundry equipment, so arranged that material moves always in one direction down the long building.

The core-making department is served by six small jib cranes of four tons capacity. The main bay has two 50-ton and one 10-ton electric travelling cranes, running its whole length. A railway siding enters the delivery end of the building, and another siding, outside, brings raw materials along the side on which the melting and refining furnaces are placed. The side bay next this siding can fairly be called the melting and forging bay, and that on the other side, the finishing bay, the central bay being used principally for casting.

Melting and Forging Bay

Along this bay there are ranged in succession core ovens and drying ovens for moulds; a small cupola and two Tropenas converters; a Héroult electric furnace; an annealing oven for castings; a re-heating oven; two small forges; and welding apparatus. A number of these items of equipment deserve more detailed description.

The cupola and Tropenas converters are not at present in use having given place to the adjoining electric furnace. Their capacity is 1½ tons per heat, and each can handle 10 heats in 24 hours.

The annealing oven is oil fired, and will take a casting up to 30 feet in length. As locomotive frames up to 36 feet in length have been made in the foundry, this capacity is required. The re-heating oven, next the forges, is 4 feet by 12 feet, and is also oil fired.

The Héroult electric furnace is of the standard three-phase type, with a capacity of 25 tons in 24 hours. It produces 6 to 7 tons per heat. It is basic lined, is fitted with 6-inch graphite electrodes, and uses a maximum current of 1850 horse power at 110 volts. The raw material used is principally a good grade of heavy melting scrap. The basic hearth allows of a very complete removal of phosphorus from the charge under an oxidising slag, which is removed. A new reducing or "carbide" slag is then built up, which removes sulphur and oxides from the bath of steel, as well as providing a cover under which the ferro-alloys required can be added with great precision. It is the use of this reducing slag for finishing the steel that makes the basic electric furnace so eminently useful in producing the highest grade of steel products. In skilful hands, it will give steel equal to the best made by the crucible process, at a fraction of the cost. Due to its strong refining action first under oxidising and then under reducing conditions, all the impurities that commonly bother the steel maker can be effectively removed, even when the melting stock is far from pure.

The additional Heroult electric furnace it is intended to install shortly will be smaller, of three tons capacity.

The forges are used principally to make the well-known Hisco balls for ball mills. They are of 900-pound and 1500-pound size, respectively. The steel billets for the balls, as cast, are lozenge shaped. In the forges they are hammered into spheres, thereby acquiring the toughness characteristic of forged products.

For welding, both oxy-acetylene and electric apparatus are available as required. It is not generally realized that no single welding equipment is suitable for all and sundry purposes; hence the necessity for having available more than one means for both fabricating and reclaiming materials by welding.

Finishing Bay

In the finishing bay there are an enclosed sand-blast with respirator for workmen, an assortment of swinging and stationary grinders, and a heat treatment furnace for manganese steel. This bay provides also ample storage for moulds.

The furnace for heat treatment is oil fired, 6 feet by 8 feet inside dimensions. It is equipped with a pyrometer for precise heat control, this same pyrometer having a thermo-couple in the annealing oven as well to which it can be switched. The wonderful qualities of the Hadfield manganese steel are brought out simply by quenching from a prescribed temperature, which appears as a bright red heat. The high content of manganese imparts to the alloy its characteristic toughness only after this quenching, which is effected in a tank of running water directly in front of the furnace, into which the red-hot castings are dropped from the furnace door.

Accessory Equipment

The foundry is well served with the accessories required by modern practice. There is a well-equipped machine shop including a 15-foot boring mill (used for finishing large gears), a large radial arm drill, and the ordinary machine shop tools. Apart from the large boring mill, the shop is used exclusively for the internal repair work and construction of the foundry.

The adjoining compressor room contains a vertical, high-speed, direct connected air compressor to provide air for rammers, oil-fired furnaces, etc. There are three small belt-driven compressors used as auxiliaries and spares. In the same building is a motor-generator set to provide direct current for welding.

The electric current used in such large quantity in the plant is brought from the Chaudière Falls generating plant, close by, at 11,000 volts, and is stepped down in a sub-station at the plant to 220 and 110 volts.

There is a separate commodious building for pattern storage, well separated from the rest of the plant on account of the risk of fire. Another building provides ample storage room for stock of the various sorts required.

A Corner of the Chemical Laboratory

All loading and unloading of scrap and of finished products (except the non-magnetic manganese steel castings) is done by means of an electro-magnet operated by a locomotive crane. This has proved a most economical and effective means of handling the foundry's raw material and products. The electro-magnet is used also for reclaiming scrap from the sand of the foundry, having displaced a special machine formerly used for this purpose.

Offices and Laboratory

A notable feature of the foundry is the attention paid to its administrative equipment. The office building is commodious and well-equipped, and its appearance is outstanding in both Hull and the adjoining Capital City. Well-planned garages are available for those who use cars.

The top storey of the office building contains the laboratory, which is fitted out to fill the needs of the foundry. Every heat of steel is analysed. A competent analyst is employed and every advantage is taken of the art of the modern metallurgical chemist — an art that, though so highly essential to the success of a modern foundry, is occult to and shunned by so many foundry managers even in these enlightened days.

Though every facility is provided for the control and direction of the operation of the foundry by means of the chemist's art, its products are sold on a basis of practical

performance. Of course castings and forgings are made to standard analysis, or to special analysis if required. This is in complete accord with modern practice. As yet we know too little of the constitution of metals, and more particularly of alloy steels, to allow us to predict physical performance on the basis of even the most accurate and detailed chemical analysis. The analyst is an essential factor in a well ordered foundry; but the quality of the product is still dependent mainly upon the foundryman's practical skill.

First Aid Building

A striking example of the care and thoroughness with which this foundry has been planned and is operated is its first aid building. This is a separate structure, close to the entrance to the works and next the time-keeper's office. It is fully and expensively equipped with all the necessary appliances and supplies, and is served by an attendant trained by the St. John's Ambulance Corps.

Mr. A. H. Coplan is president and general manager of the Hull Iron and Steel Foundries. Mr. F. H. Cross is assistant manager. Mr. Coplan is to be congratulated heartily for his success in building up a unit in our indigenous iron and steel industry that is a credit to Canada and points the way to further development.

RED LAKE DISTRICT

by E. L. Bruce

The following brief report by Dr. E. L. Bruce to the Department of Mines, Toronto, was made on his return from the field recently and has been made available for immediate publication through the kindness of Mr. Thos. W. Gibson, Deputy Minister of Mines.—Ed.

The rocks in the vicinity of the recently reported silver fields along the shores of East Bay, are lava flows largely altered to greenstones or to chlorite schists. Interlayered with the lavas are light colored quartz porphyries that are also probably volcanic rocks. Along the east shore of the bay the rocks are purple and green schists of somewhat doubtful origin with many rusty zones in which there is considerable carbonate. Calcite also occurs as blebs in the greenstones and as small stringers. These rocks are intruded southeast of Red Lake by granite. Several miles west of East Bay similar volcanic rocks are associated with slate, iron formation and some bands of conglomerate. All the rocks are much disturbed.

The original discovery, which was the only one made at the time of examination, is a vein four to six inches in width, with some parallel stringers, consisting of about equal quantities of quartz and galena. The galena is said to carry high values in silver. No native silver was seen by the writer. It is possible that silver sulphide or other silver minerals may be found on further examination but they were not recognized in the field examination of the specimens. The original vein had been traced only a short distance. The heavy forest cover and high water level of the lake combined to make prospecting rather difficult.

It is possible that important developments may follow this find. The original discovery vein is small even though it should prove to be high grade, but further prospecting may uncover larger deposits. It should be clearly understood, however, that both the mineral association in the vein and the rocks in which the veins occur are quite different from the native silver occurrences of Cobalt and Gowganda. It will require a considerable amount of thorough prospecting and development before the value of the new discovery can be properly determined, and reports of the size of the new field and the values found in the veins should be accepted with much reserve.

MINERALS AND MINING INDUSTRIES on the CANADIAN NATIONAL RAILWAYS

There has just been issued by the Industrial and Resources Department of the Canadian National Railways a pamphlet of 64 pages written by Mr. C. Price-Green, Commissioner of that department. This little volume describes concisely, yet comprehensively, the mineral deposits, developed and undeveloped, that have been found along the Canadian National lines, from Atlantic to Pacific, and from the international boundary to Fort MacMurray.

An introductory section of six pages summarizes the principal geological features of Canada and delineates the mineral-bearing areas. Stress is laid upon the extreme importance to any railway, and particularly to the Canadian National Railways, of mineral development. Only by means of the volume of freight traffic incidental to wide-spread mining operations can the National lines be made to pay or even be self-supporting.

The economic minerals are dealt with in alphabetical order, their number (forty-one) indicating the wide variety available. The chief deposits are described briefly, and others of prospective value alluded to. References are given to more voluminous sources of information. Many practical suggestions are included with a view to stimulating the use of these minerals.

Throughout the pamphlet, Mr. Price-Green maintains the forward outlook. He mentions opportunities and practical possibilities on every page. Progress in the past he interprets in the light of greater progress for the future.

The pamphlet can be obtained by those interested from the Industrial and Resources Department, Canadian National Railways, Toronto, Ont.

SOUTH CAROLINA WHITE CLAYS

The methods of mining and preparing white clays for market in the vicinity of Langley, South Carolina, are described in Serial 2382, by W. M. Weigel, mineral technologist, just issued by the United States Bureau of Mines. Langley is about nine miles north of Augusta, Georgia. The clays mined in this district are sedimentary kaolins with few impurities. The prevailing color is white; at times the color is smoky grey or pink, and occasionally strong pink to lavender. The lighter colors usually become white on exposure to the air and on drying. The lower parts of the beds are usually the whitest. These kaolins are fine grained in texture, and have good plasticity; their tensile strength is from 8 to 36 pounds. They generally slake readily. Their specific gravity is from 2.50 to 2.25. The clays in the district are well adapted for use in paper stock, for which they are mainly used, and in pottery and china ware, without washing. In the district as a whole, considerable reserves of clay are yet untouched, hence the industry can be considered fairly stable. Serial 2382 may be obtained from the Bureau of Mines, Washington, D.C.

New Plant of Northern Ontario Gold Mine Possesses Unique Features

by F. A. McLEAN

A new mining plant possessing a number of unusual features was recently installed by one of the Northern Ontario Gold Mines.

The entire equipment was furnished by the Ingersoll-Rand Co., Ltd., and consists essentially of a Four Drill Class "EL-1" Air Compressor with unloader and receiver, belt-driven from a 2 cylinder, 2 stroke cycle, "Fairbanks Morse" Oil Engine. The engine is equipped with friction clutch pulley and small auxiliary starting engine and compressor.

Other equipment includes a 6x8" Class "SSR" "CIR-CO" Double Cylinder, Single Drum, Reversing Air Hoist with a capacity of 4,000 lbs., 500 ft of plow steel cable, 4ft. sheave wheel, ore buckets, ore cars, pump, water tank for drills, compressor and engine; piping, hose steels, blacksmith tools, 2 "DDR-13" "Jackhammers" a New Jersey Forge Blower and a complete set of tools and spares for making minor repairs to the important parts of the outfit.

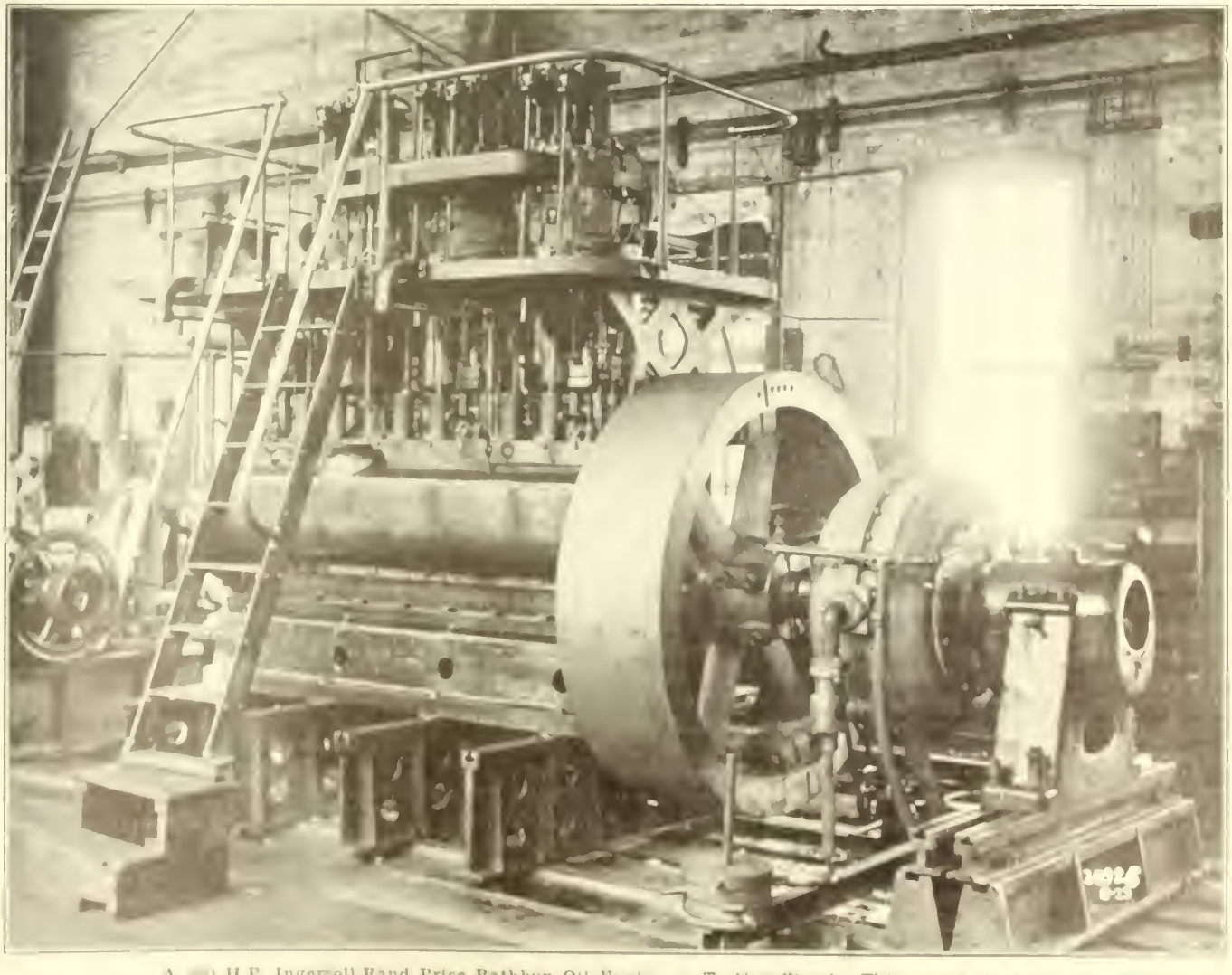
In such respects as completeness of the equipment furnished and the urgency of the delivery—four weeks—this installation resembles the outfits shipped into the Rossland camps twenty-five years ago. A favourite plant at that time was a "Rand" class "C" Compressor with Receiver, 60 H.P. boiler, hoists, drills, skips, buckets and all piping cut to length ready to set up.

The compressor chosen for the plant under discussion is of the single stage, centre crank, enclosed frame, straight line type with 12 x 12" air cylinder and a piston displacement of 340 cu. ft. per minute at 220 r.p.m., the approximate shipping weight of which is 5,200 lbs.

This type of compressor is particularly well adapted for this class of service owing to its simplicity, dirt proof construction and automatic lubrication and regulation at all speeds.

The Oil Engine is of 12" bore by 15" stroke developing 75 H. P. at a speed of 320r.p.m. and weighs about 18,000 lbs. It is fired by the heat of compression and is provided with a hot tube to permit quick starting.

The selection of fuel is a primary consideration in any industrial or mining project and one upon which the ultimate success or failure of the venture often rests. The mine mentioned above is located twelve miles from the nearest railroad so that the use of coal was out of the question, owing to the difficulty and cost of transporting and storing a sufficient quantity to permit continuous operation. There is an abundant supply of wood near the property, but the operators realized, that if this was used, the more they cut, the

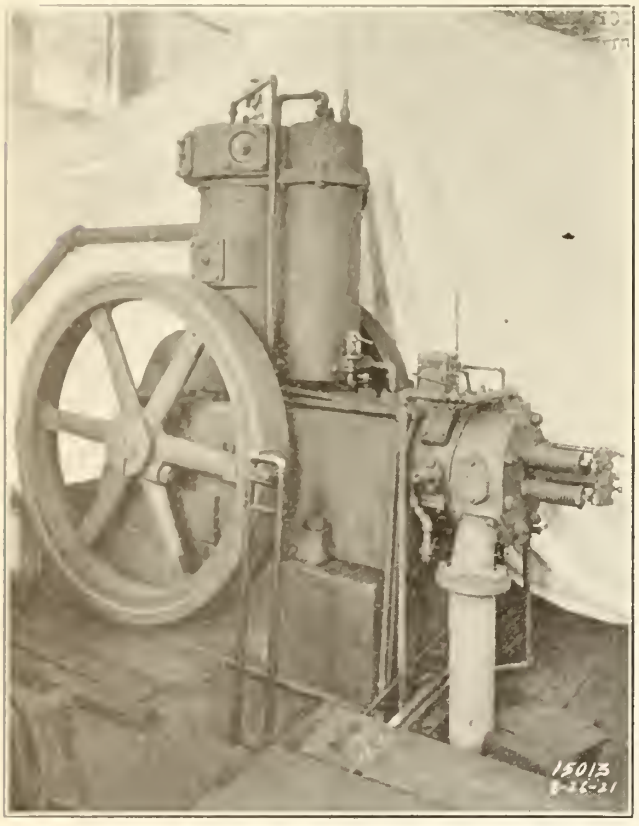


A 60 H.P. Ingersoll Rand Price Rathbun Oil Engine on Testing Stand. This type is built in sizes of 105 to 1000 B.H.P. Similar units are also furnished for Marine service.

farther they would have to transport each succeeding month's supply. This, of course, meant a constantly rising fuel cost.

After careful investigation it was found that an oil engine, of the direct fuel injection type, would give a power cost considerably lower than that obtainable with either coal or wood and furthermore, the oil could be easily obtained and readily transported.

Additional advantages in favor of the oil engine drive were simplification of equipment, reduction in labor charges, the elimination of stand-by losses and a saving in space due to the absence of boilers and accessory equipment.



"I-R", Type "POV-2", Direct-Connected Oil-Engine, Two-Stage Compressor. Similar Units are Available also for Single Stage Compression.

Modern oil engines will operate efficiently on low grades of oil, and fuels of this class are so readily obtainable and transported, that this form of prime mover, in connection with a compressor of the practically automatic, enclosed type, would seem to offer a simple, cheap and reliable source of power for the operation of hoists, drills, pumps and other equipment required in the development or operation of isolated mining properties.

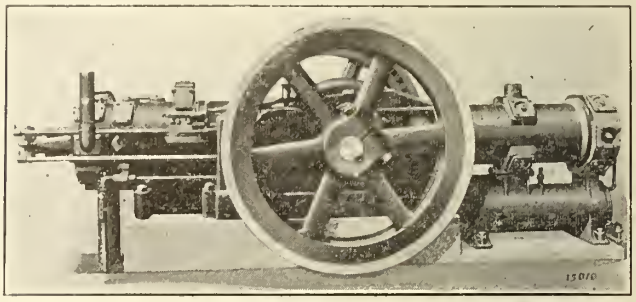
The best equipment of this class is now obtainable in a large range of sizes, can usually be dismantled into sections small enough to permit transportation over rough country, and on arrival is easily erected and operated by men of ordinary intelligence.

Due also to the rugged construction, the self-contained features and the few accessories required by a plant of this type the problem of suitable foundations and suitable protection from the elements is easily solved.

Taking these facts into consideration it seems quite reasonable to suppose that plants of this character will not only permit the developing of many promising properties that would otherwise be forced to await the construction of railroads, but in some instances may lead to a reduction in the operating costs of existing mines.

A new "Ingersoll-Rand" Direct Connected Oil Engine Driven Two Stage Compressor particularly adapted for mine service is shown in the illustration herewith.

This unit known as a "POC-2" consists of a 100 lbs. 497 cu. ft. Two Stage Air End equipped with "Ingersoll-Rand" Plate Valves directly connected to a 90 H. P. Horizontal Single Cylinder Four Cycle Single Acting Direct Injection Type "I-R" "Price" Oil Engine.



This Type Available also for Single-Stage
A 497 cu. ft. "I-R", Type "POC-2", Direct-Connected Oil-Engine Compressor, with Two-Stage Air Cylinders. Compression.

Both the engine and compressor are of the enclosed type and the former develops 17 to 18 H. P. per gallon of fuel oil having a heating value of 18,500 B. T. U. per pound.

A smaller compressor with vertical air cylinder known as the "POV-2" with a piston displacement of 271 cu. ft. of free air per minute is also furnished. Both units are also built for single stage compression.

For larger air plants or where oil driven prime movers for driving generators, pumps, or line shafts are required a vertical multi-cylinder four stroke cycle Ingersoll-Rand Price-Rathburn type engine is used. This type is made in sizes of from 105 to 1,000 B. H. P. for stationary use and in sizes of 220 to 750 B. H. P. for marine use.

DETERIORATION OF STORED CEMENT

Deterioration of cement stored in bulk is less than in bags, owing to the smaller area exposed, states the United States Bureau of Mines, as the result of an investigation to determine the cause of deterioration of Portland cement during storage and transportation. Hydration takes place only at the exposed surface, and the bulk of the cement is unaffected. Cement transported in bulk must be shipped in a tight, closed car, and must be protected from moisture during loading, shipping, and unloading. Preferably it should be used immediately after unloading at the point of destination. This practice is now followed by several manufacturers and where conditions are suitable it is becoming more common as its advantages are seen. Shipping in bulk effects a saving by eliminating the use of bags—which is an important item in the cost of cement—and it should also permit a saving in freight rates. Details of a study of the storage and transportation of Portland cement, with a bibliography on the subject, are given in Serial 2377, obtainable from the Bureau of Mines, Washington, D. C.

Lightning River Gold Area*

BY CYRIL W. KNIGHT

A discovery of native gold in quartz having been reported in the Lightning River area, on what is known as the Seagers claim, at the northwest corner of Holloway township, the writer was instructed by Mr. Thos. W. Gibson, Deputy Minister of Mines of Ontario, to visit and examine the new occurrence. An examination was consequently carried out during the latter part of August and early in September, 1922, at which time about sixty men were in the area.

The Seagers claim, No. 10,080, is about four miles north of the Cochenour claim, No. 7135, on which gold was discovered by Messrs. Howey, Cochenour and Williams in August, 1917.

The Lightning River gold area is in the district of Timiskaming, south of Upper Lake Abitibi, and includes the township of Holloway and Harker, six miles south of the lake. The area is now easy of access. Most prospectors enter it by way of the village of La Reine, in the province of Quebec, on the Canadian National railway, 72 miles by rail east of Cochrane, Ontario. There is hotel accommodation at La Reine. At the time of our visit, the Canadian Mining Syndicate, now the Abitibi Mines, was running, four or five times a week, a 35-foot gasoline boat, covered, from La Reine down the Okikodesik river, across Upper Lake Abitibi, and thence about six miles up the Lightning river to a dock. From this dock a rough "jumper" road, about two and a half miles long, has been constructed to the Seagers claim. Numerous trails have been cut recently by prospectors in the northwest part of Holloway, and the northeast part of Harker township.

In the winter season the quickest way to enter the area is by a winter road from Ramore, a station on the Temiskaming and Northern Ontario railway, 92 miles north of Cobalt. The Ramore road only goes as far as the southwest corner of Holloway township, to the Cochenour claim, No. 7135, of the Lightning River Gold Mines, Limited. A trail, however, connects the Cochenour claim with the Seagers claim at the northwest part of Holloway township.

During the past year there has been considerable activity in the Lightning River gold area, and many claims have been staked. The blue prints, for instance, issued by the Ontario Department of Mines, from the North Bay office on September the eleventh, 1922, show that much of the east half of Harker and the west half of Holloway townships have been staked and recorded. To be exact, there were staked and recorded on September the eleventh, according to the blue prints referred to above, 168 claims on the township of Holloway, 15 of which had been surveyed by an Ontario land surveyor. In the township of Harker, 155 claims had been staked and recorded, of which 7 had been surveyed by an Ontario land surveyor. In Fraserdale township, north of Holloway, four claims have been staked and recorded, while in Guibord township, west of Harker, four claims have been staked and recorded.

In a hurriedly written preliminary report of this nature, time does not permit the publication of a new geological map of the area. It is therefore, advisable, if the report is to be read intelligently, to have the most recent blue prints of Holloway and Harker township; these may be obtained from the office of the Mining Recorder, Swastika, Ontario. The coloured geological map of the Abitibi Night Hawk Gold Area, issued in 1919, should also be obtained from the Ontario Department of Mines, Toronto, Ontario.

Acknowledgments

During the examination, the writer was accompanied by Mr. D. G. H. Wright to whom he is greatly indebted for many suggestions and helpful discussions in connection with this brief report. To Mr. Russell Cryderman, also, the writer wishes to express his thanks for cheerfully guiding him to many claims on which work was done. It may be added that Mr. Cryderman prospected in this area in 1908 and staked some ground near what is now know as the Seagers claim.

The writer wishes to express his thanks to the Canadian Mining Syndicate, now the Abitibi Mines, for many courtesies shown, and particularly to Mr. I. W. C. Solloway who has been associated with this syndicate. Thanks are also due to the Lightning River Gold Mines, Limited, with which company are associated Messrs. Howey Cochenour and Willans.

The assays and chemical determinations were made in the Ontario Provincial Assay Office, by W. K. McNeil, Provincial Assayer, and T. E. Rothwell.

History of the Area

Prospectors are said to have explored in the Lightning River area in the years 1907 and 1908, at which time some ground near the Seagers claim was staked. Included among the pioneers were Russell Cryderman, Wm. Copper and Wm. Woodney. In those days, however, it was difficult to get capital interested in that part of the country, remote and somewhat inaccessible as it was. Moreover, prospecting for silver was more fashionable then than it is now.

In the year 1917, Messrs. Howey, Cochenour and Willans, working northeastward from Kirkland lake, discovered in August of that year, a vein of gold-bearing quartz at the southwest corner of Holloway township on what subsequently became known as the Cochenour claim, No. 7135, of the Lightning River Gold Mines, Limited. As a result of that discovery, the Ontario Bureau of Mines the following year decided to make an examination of the area, and Mr. A. G. Burrows and the writer were instructed to report on and geologically map in a general way, the Lightning River area, particularly that in the vicinity of the Cochenour claim.*

An inclined shaft dipping at an angle of 23 degrees was sunk on the Cochenour vein to a depth of 70 feet, at a depth of 50 feet, the vein is reported to have passed from a basalt lava flow into a rhyolite flow. The quantity of gold in the vein is said to have decreased when the vein entered the rhyolite. This constitutes the main work which has been done on the Cochenour.

Recently a claim known as the Meridian claim, No. 7247, in Harker township, about a mile and a half west of the Cochenour, has been attracting attention, and a shaft has been sunk to a depth of 18 feet. The deposit on this claim is described elsewhere in this report.

Finally, the discovery this year on the Seagers claim

* "Abitibi Night Hawk Gold Area," by C. W. Knight, A. G. Burrows, P. E. Hopkins, and A. L. Parsons; Ont. Dep. of Mines, Vol. 28, Part II, 1919.

of a vein of quartz containing rich gold specimens, about four miles north of the Cochenour, has aroused new interest in the area.

Rocks of the Lightning River Area

Most of the rocks of the Lightning River gold area belong to the Keewatin series, and consist of lava flows. In the south part of Holloway and Harker townships, at the properties of the Lightning River Gold Mines, Limited, the lava flows have been studied and mapped in some detail by the geologists of the Ontario Department of Mines. Fourteen flows have been recognized, having a combined thickness of 4400 feet. Most of the flows are dark green basalts or andesites, but a few are pink rhyolites. The flows have been tilted up into almost vertical positions, dipping steeply south and striking westward.

At the north end of Holloway and Harker townships, prospectors during this year have discovered half a dozen small outcrops of conglomerate, greywacké and slate. These rocks probably belong to the Timiskaming series, and are younger than the Keewatin lava flows. Owing to the heavy overburden of clay, sand and gravel, the extent of these sediments is not known. They strike westward and dip at steep angles. The conglomerate contains pebbles of feldspar-porphyry, red jasper, and chert of various colours. Some fine-grained greenstone and green schist pebbles also occur.

The great intrusion of diabase or gabbro of Ghost mountain is about five miles long and a mile wide. It is in all probability younger than the Temiskaming sediments, and Haileyburian in age.

Finally intrusion of feldspar-porphyry and quartz-porphyry cut the Keewatin and Temiskaming series and presumably the diabase or gabbro of Ghost mountain. In the Lightning River area these porphyry intrusions have not been found to be numerous, only a few small dikes having been met with. However, the drift is so widespread that it is quite possible there are large intrusions of these "gold bringers". Great masses of syenite and granite occur in Garrison and Harker townships. The geology, as briefly outlined in preceding paragraphs, may be summarized in the following table, the older rocks being shown at the bottom of the column:—

Algoman Series	Feldspar-porphyry, quartz-porphyry, syenite, granite.
Haileyburian Series ...	Diabase, gabbro and serpentine of Ghost mountain.
Temiskaming Series .	Conglomerate, greywacké, slate.
Keewatin Series . .	Basalt, andesite, dacite rhyolite.

Running in an east and west direction through the north end of Holloway and Harker townships, is a belt of schistose rocks. This belt of schist consists of Temiskaming sediments and Keewatin basalts greatly sheared. The belt extends along its strike for at least three or four miles, and disappears below the drift toward the west. It may be said to occupy, in a general way, the valley of the Teddy Bear river, most of the shearing having taken place on the north side of the valley.

While the lava flows in the south parts of Holloway and Harker townships have been tilted up into vertical positions, and therefore considerably disturbed, they are not, except in rare instances, altered to schist. Nor is the diabase and gabbro intrusion of Ghost mountain at the north end of these townships rendered schistose.

The Teddy Bear valley, bounded as it is on the north by the towering Ghost mountain and on the south by hills of little altered lava flows, forms the centre of prospecting activity at the present time.

Dome Mines Conglomerate

The discovery this year in the Lightning river area of Temiskaming sediments, consisting of conglomerate, greywacké, and slate, raises the question as to the relation of the gold deposits of north-eastern Ontario to these belts of sediments.

Beginning at the Dome mine in Porcupine, there is a belt of these sediments striking eastward for 16 miles, the last known outcrop being in German township. To the east for 27 miles the rocks are almost entirely drift covered. Then there outcrops another belt of the sediments, about nine miles long, in the Croesus gold mine area. East of the Croesus belt for a distance of 22 miles, the rocks are again almost entirely drift covered, until, in the Lightning river area, conglomerate, greywacké and slate once more make their appearance in a few places. These three occurrences of Temiskaming sediments, namely the Dome mine, the Croesus and the Lightning river, may belong to the same great east and west belt of deeply infolded sediments. In the year 1915, Mr. P. E. Hopkins suggested that the Croesus belt of sediments might be continuous with the Porcupine belt.

The Great Gold Belts in Northeastern Ontario

From 25 to 40 miles south of the great belt of sediments referred to in the preceding paragraph is another important belt of similar rocks of which the Kirkland Lake band forms the most important part. This south belt begins in Midlothian township, outcrops again in the Matachewan gold area, and is developed to the east in large volume in Kirkland lake and Larder lake. Over much of this belt gold occurs.

Thus there may be said to exist in northeastern Ontario two main gold belts which contain the most important gold mines in the Province. The belts are roughly parallel to each other and 25 to 40 miles apart. Each is in the neighborhood of 70 miles in length, and each follows a belt of Temiskaming sediments consisting of conglomerate, greywacké and slate. Occurring in, or near, the northern belt of sediments are the Dome and other mines, the nearby Hollinger mine, the Croesus and the gold prospects of the Lightning River area. The south band includes the Matachewan, Kirkland lake and Larder lake deposits.

As is well known, the beds of sediments on these two belts have been mapped almost entirely by A. G. Burrows and P. E. Hopkins.

Why Gold Follows Temiskaming Belts

Some years ago the Provincial Geologist of Ontario, Dr. Willet G. Miller, draw attention to the relation of the gold deposits of northeastern Ontario to belts of conglomerate, greywacké and slate of the Temiskaming series.

In emphasizing the broad general relationship between belts of Temiskaming sediments and gold deposits it is not meant to under-rate the immense influence which intrusions of feldspar-porphyry and quartz-porphyry have played in the formation of the gold deposits. In the prospector's mind is indelibly fixed the importance of these porphyries. "No porphyry, no gold". But the occurrence of gold in or near the two great belts of Temiskaming sediments is a matter of fact, not of theory.

Viewed from this angle, the Lightning River gold field assumes a new importance as a prospective gold area. Therefore, to the prospector we would say: *explore for feldspar-porphyry and quartz-porphyry intrusions*

in or near these great belts of sediments. Incidentally it may be mentioned that there is a band of Temiskaming sediments 25 or 30 miles north of the Lightning River area, in Steele township on the shore of Lake Abitibi, which may be worth prospecting.

The Seagers Claim

The discovery which is attracting attention at the moment is near the northwest corner of Holloway township on claim No. 10,080, about three quarters of a mile south of Ghost mountain. This claim is known as the Seagers claim. Gold was first found on it in February, 1922, by Mr. Wm. S. Seagers, who obtained the precious metal by panning. Subsequently the claim was obtained by the Canadian Mining Syndicate, now known as the Abitibi Mines, and after some stripping and blasting were done, a narrow vein of gold-bearing quartz was discovered in July. From this vein specimens of native gold have been obtained.

The discovery was made on a low, flat hill, the country rock of which is fine-grained basalt, with a light grey colour on fresh surfaces, but with a rusty brown colour on weathered surfaces. While the rock is much altered, and impregnated with rusty weathering iorn carbonate, it is not, however, schistose. The hill has been trenched and stripped to a considerable extent, and some shallow pits blasted in the rock. In these pits it may be seen that iron pyrites in small crystals impregnates the country rock but it cannot be said that the rock is heavily mineralized with pyrite. The rusty brown colour of the fresh or weathered surfaces appears to be due more to the oxidation of the iron carbonate than to the oxidation of iron pyrites.

This hill is intersected by numerous quartz veins varying in width from fractions of an inch to two or three feet. The vein from which the rich specimens of native gold have been obtained averages a few inches in width, bulging at one place to 15 or 20 inches. It is in the widest part of the vein that most of the native gold occurs. The vein strikes south about 20 to 25 degrees west, dipping, apparently, at an angle of about 15 degrees eastward. It was exposed for about 50 feet at the time of our visit, but a greater length was said to have been uncovered in a trench, which was full of water at the time of examination. The vein strikes southward into [illegible] of ground.

Iron pyrites occurs sparingly in the vein, but is more abundant in the country rock. Traversing at angles of 15 to 90 degrees across this vein are stringers of white quartz, [illegible] in width from fraction of an inch to an inch or two in width.

Native gold specimens can also be said to have been obtained from a cradle pit on this hill. The pit was full of water at the time of the examination.

In various places on the hill fine gold may be obtained by panning the [illegible] mineralized material.

Some of the specimens contain feldspar and tourmaline. It appears likely that the country rock contains in places chromite, emerald green micaceous mineral which has been determined by Mr. W. K. McNeill, Provincial Assayer. Mr. McNeill found no trace of chromium, but [illegible] finding from tests which he made, that the green colour is due to ferrous iron.

An interesting feature of the Seagers occurrence is that an outcrop of conglomerate of the Temiskaming series occurs [illegible] hundred yards away, on claim No. 10,082, about five chains south of the northwest corner post, the west boundary line.

The Seagers claim is the only one in the north part of Holloway and Hawley townships on which we saw native gold. Although gold could be obtained by panning oxidized material elsewhere in this section. At the south part of these townships, however, native gold is known to occur over a wider area.

Four log cabins have been erected by the Canadian Mining Syndicate, now the Abitibi Mines.

The Meridian Claim

While the main object of our visit to the Lightning River gold area was for the purpose of examining the Seagers claim, a visit was also paid to the Meridian claim at the southwest part of the township of Holloway, about three and a half miles south of the Seagers claim. The Meridian claim, No. 7247, in Harker township, is so named because the gold deposit on it intersects the east boundary of that township; this boundary line was surveyed as a meridian line some years before Harker township was surveyed. The meridian line was subsequently used as the east boundary of the township hence the name "Meridian" claim.

The gold deposit on the Meridian claim was described by A. G. Burrows in 1918.* At that time the claim was known as the "Cochenour, in Harker township". Very little work had been done on the claim. Recently a shaft has been sunk on the ore body to a depth of 48 feet. The shaft is located about 200 feet west of the east boundary of the claim. It may be seen that the ore body dips steeply to the south, and strikes about westward.

The ore body consists of a shear zone in basalt which has been impregnated with fine-grained iron pyrites. The average width of this pyritic zone is about three or four feet; in places its width is five or six feet or more. Very little quartz is to be seen. The rock on the dump from the shaft is not schistose so it may be judged that the shearing was not intense. The rock appears to be slightly silicified, and impregnated with a little rusty weathering iron carbonate. A little finely divided native gold has been found in the pyrites zone. A grab sample of the material on the dump from the shaft was taken by the writer and assayed by T. E. Rothwell of the Ontario Provincial Assay Office, and found to contain $9.60 of gold per ton. The deposit is covered immediately to the west of the shaft by swamp and drift, said to extend some distance to the westward. This is a promising claim.

The deposit passes on the east into the Taylor Horne claim, No. 7261, in Holloway township. On this claim a quartz vein six to eight inches wide occurs in the shear zone, and some native gold has been found in the vein. Mr. A. G. Burrows has noted the presence of pyrite, copper pyrites, zincblende, and galena in the vein, and some selected material by him from the vein gave on assay $1.40 in gold.

The deposit on the Taylor Horne and Meridian claims has a length of more than three hundred and twenty five feet. As stated above it passes at the west end under swamp and drift.

In March, 1922, the Temiskaming Testing Laboratories at Cobalt made some tests on a shipment of 1820 pounds of ore from the Meridian claim. The ore was submitted by the Lightning River Gold Mines Limited. The laboratory found that the shipment contained ore assaying $14.00, in gold and 1.6 ounces of silver per ton.

After carrying out certain amalgamation and cyanidation tests on this shipment, the Temiskaming Testing Laboratory reached the following general conclusions:

1. Amalgamation will give a recovery of about 75 per cent. of the gold.

* Loc. cit.

2. Cyanidation will give a recovery of about 95 per cent. of the gold.
3. Amalgamation and cyanidation combined will give about 95 per cent. recovery of the gold.
4. Whatever method is adopted fine grinding will be necessary.

There do not appear to be any interfering elements, and even with fine grinding very little slime is formed, so that the ore is an ideal one to cyanide. Tests by water concentration on a Wilfley table indicate that the gold is probably associated with the pyrite.

Claims Near Seagers Claim

Prospectors have been attracted by a belt of schists and other less highly sheared rocks which strike westward across the north part of Holloway and Harker townships. The Seagers claim is on this belt. During our visit we examined several claims along the belt where either the rock or the ore deposits might prove of interest, and a few notes may be added regarding these claims, beginning with the most eastwardly one visited, namely, No. 11,013, in Holloway township. We are indebted to Mr. Tom O'Neill for his kindness in guiding us to this claim. At the northeast corner of the claim considerable stripping has been accomplished and some blasting has also been done. The rock here is a rusty weathering, iron carbonate schist, striking west 10 to 20 degrees south magnetic, and dipping steeply to the north. Narrow stringers of quartz and iron carbonate containing a little iron pyrites intersect the country rock. The country rock also contains a little iron pyrites. Fragmental material was noted in one place, but the rock is too much altered to determine its true character.

West of this claim about three-quarters of a mile is the "east" Remo claim, No. 8246, in Holloway township. At the northwest corner of this claim a tunnel has been driven southward into the side of a hill a distance of 35 feet. The tunnel intersects a rusty weathering brown schist impregnated with iron carbonate, striking westward and dipping 80 degrees to the south. A few stringers of quartz about an inch in diameter occur parallel to the strike and dip of the schist. A curious occurrence of dull-looking graphite is found along a few zones in the schist.

West of here about a quarter of a mile, some work has been done on "west" Remo claim, No. 8247, in Holloway township, at the north part of the claim near the trail. A vein of quartz from a few inches up to two feet in width has been found, occurring in an altered basalt impregnated with rusty weathering iron carbonate.

Two claims west of the "west" Remo, the Mining Corporation of Canada, Limited, has done some stripping in several places on claim No. 10,476, in Holloway township. On the north part of the lot a schistose pillow lava has been stripped for a length of 100 feet and a maximum width of 40 feet. The schist dips almost vertically. A few small stringers of quartz up to six inches in width occur. A minor fault follows the strike of the schist. Gold has been panned in the rusty oxidized material. On another part of the claim, where stripping has been done, the massive rock has a pale mauve colour, and is impregnated heavily with iron pyrites. At the southeast corner of the claim a trench 100 feet long and 10 feet wide has revealed finely bedded slate of the Temiskaming series, striking north 73 degrees east and dipping steeply to the north. In places these slates are highly contorted.

On the claim immediately to the north, No. 9864, in Holloway township, there is an outcrop of schistose, fragmental-looking rock ,at the southwest corner of the claim at the roadside. This claim is owned by the Mining Corporation of Canada, Limited.

On the contignous claim to the west, No. 9863, in Holloway township, near the southwest corner, on the south boundary line, there is an outcrop of a grey rock resembling a feldspar-porphyry on weathered surfaces. Seven thin sections of this rock were examined under the microscope, and it was found that the rock is too much altered to positively identify. In the meantime, until further stripping is done, or new outcrops found, the rock may be tentatively classed as a feldspar-porphyry. Crushed schistose porphyries and schistose greywackés are often difficult to distingnish.

On the claim contignons to the west, No. 9862, in Harker township, there is, near the southeast corner, an outcrop of quartz-porphyry which is locally known as the "Cooper dike". This rock was said to have been found some years ago by Mr. Wm. Cooper. The quartz-porphyry is in contact with a grey, vaguely banded, siliceous rock resembling certain phases of "iron formation."

The claim immediately to the south, No. 10,084, in Harker township, known as the Manwell, contains an outcrop of a rock resembling conglomerate. The outcrop as about 500 feet west of No. 1 post, and 25 feet south of the north boundary line. The pebbles and fragments are mainly of feldspar-porphyry and green schist. The rock has been sheared and the fragments more or less flattened. It is of doubtful origin, judging from the small outcrop visible.

Cornering at the northwest on the claim referred to in the last paragraph, is claim No. 10,531, in Harker township. Some heavy tranching and shallow blasting has been done by the Teddy Bear Syndicate on an outcrop of rusty-weathering, iron carbonate rock, which is intersected by a new-work of white quartz stringers varying in width from a few inches up to two or three feet. These white quartz veins with a background of the rusty brown rock give the outcrop a striking appearance. A few grains of iron and copper pyrites were noted; and the occurrence of a dull-looking graphite may be put on record.

Six claims to the west, on claims Nos. 11,347 and 11,348, in Harker township, a white quartz vein, averaging about a foot in width, has been stripped from point to point across the two claims. It occurs in porphyrite which is not schistose.

Immediately south of these two claims, on claim No. 11,267, known as the Compton-Pollard, in Harker township, some stripping has been done on a brown schist which is cut by many parallel quartz veins and stringers. The schist contains much rusty-weathering iron carbonate.

Four claims south of the Compton-Pollard, on the Roche claim, No. 11,290, in Harker townshinp, some work has been done. This property was examined by Mr. D. G. H. Wright, who reports that stripping, trenching and a little blasting had been done. There is a disturbed zone 10 or 12 feet wide, striking east 5 degrees south magnetic, which is silicified and impregnated with iron carbonate.

About a mile south of the Seagers claim, a red feldspar-porphyry dike has been discovered at the north end of claims Nos. 11,009 and 11,010. These claims are known as the O'Neill claims, and are in Holloway township. The dike is three to five feet in width, strikes about east and west, and appears to have a nearly vertical dip. The occurrence is about 200 feet south of the north boundary line. The country rock is an altered basalt which is impregnated with iron pyrites at and near the

dike. The dike has been stripped for about 300 feet and a few shots put in. The country rock appears to contain more iron pyrites than does the dike. Gold has been panned in the rusty oxidized material along the dike and in the country rock. A good trail has been cut from these claims northward to the Canadian Mining Syndicate claims.

Immediately east of the O'Neill claims, Mr. P. A. McDermott has done a little work on claims Nos. 11,381 and 11,382, in Holloway township.

South of the O'Neill claims, on claim No. 11,313, in Holloway township, Mr. R. Reid has done some stripping. A narrow quartz vein occurs in basalt.

In Frecheville township, at the forks of the Lightning river, Mr. Dillabough has done a little stripping on the west bank of the river. The rock here is a light coloured grey schist, with a greenish colour on fresh surfaces. The schist has a fragmental appearance due to the presence of light grey lenses of hard siliceous material set in a yellow matrix. Veins of quartz up to 20 inches wide occur parallel to the schist.

Summary

It has seldom been the custom of the Ontario Department of Mines to systematically sample the various deposits which the officers of the Department examine from time to time. Consequently, in sizing up an area, it has been necessary to base an expression of opinion largely on geological structures, although the results of careful sampling by companies or individuals have frequently been available. In the case of the Lightning River area, the writer believes that, at the north parts of Harker and Holloway townships, the severe disturbance and alteration to which the rocks have been subjected are favourable to the deposition of gold ore, and give promise of further discoveries being made. The finding by prospectors of a belt of schisted Temiskaming conglomerate may fairly be judged another point in favour of the occurrence of gold, since both in Porcupine and Kirkland Lake, the gold mines occur in or near these belts of Temiskaming conglomerates. The gold bearing vein on the Seagers claim is but 500 feet distant from an outcrop of Temiskaming conglomerate.

At the south part of Holloway township, three and a half miles south of the Seagers claim, the Meridian claim is a promising prospect, if one may judge from the results of assays shown the writer.

Finally, while it should be noted that the occurrences of gold in the Lightning River area in the prospect stage, the area is unquestionably worthy of further and more intensive prospecting.

News and Comments

BY ALEXANDER GRAY

Lend a Hand to the Hard Hit

Another of those periodic holocausts that have brought desolation and death to the Ontario Northland makes it opportune to call attention to the unwisdom of maintaining forest reserves where there is an army of prospectors and pioneers will seek the shortest route to make their claims. The scene of the latest visitation and the deplorable loss at Haileybury, Englehart, North Cobalt, and elsewhere may be sought as a safeguard against recurrence of disaster; but the cause will still remain while there is dryness in the bush and while parched vegetation may smoulder.

Eleven years ago from the gold mines of the magic land that suffered and the fatalities were all too great. The story of George Wood and his family caught and suffocated in the Wood Dome Shaft; the heroism of Meek and his wife and children in the Dome and the sacrifice of "Billy" Moore, the dearest of the Three Men Creek of earlier Porcupine are almost forgotten.

"Billy" Moore in his endeavors to succor the panic stricken, [illegible] would have preserved his own life or the [illegible] who subsequently declined [illegible] the heroic deed in order to enable [illegible] to procure a Carnegie contribution for Moore's [illegible] family.

Brave men and women have been in the making of the Northland. Where there are rewards, there are risks. Mankind survives. There is widespread sympathy [illegible] in the [illegible] anticipating prosperity and [illegible] after adverse years. Hard as the lessons are, they will spur the Provincial authorities and all others concerned to [illegible] precautions and lend with lavish hands [illegible] the immediate relief of the victims.

The fire [illegible] the charred remains, human and material, are distressing incidents in the march of progress. At the moment first aid must come from all sections. Without Northern Ontario other localities might not object to collecting insurance if they were visited by destructive fires. Old Ontario will stand by New Ontario in this hour of need.

Anglo-French Exploration Canadian Holdings

It is so exceptional to have London combinations of mining capital do common-or-garden-sense Canadian business, that it is a small-favors thankfully received matter to note that the Anglo French Exploration Corporation held 9960 Hollinger Consolidated shares; 50,000 Lake Shore, and 5000 International Nickel. "At the market", those holdings now are worth (supposing the market has not been availed of before) approximately $360,000. No doubt the profit obtained from what Hollingers were disposed of, will adequately compensate this mining group for its investigation of Canada and its mineral resources. That a profit is a profit, is a truism, but the capable chiefs of Anglo French might have been better advised had they retained all their Hollinger, taken more Lake Shore, and made another visit or two to the Creighton Nickel Mine. Mr Tyrrell did not do so badly as a "picker". While Canada appreciates the participation of one of the South African groups, even to this extent, "some day", perhaps, London will take its bearings and shape its course somewhat differently. At the moment, New York is annexing most of the good, bad and indifferent business; that is, what London has overlooked, although inquiries from overseas indicate that the Three Kingdoms have quite a collection of "sheep" pastures.

What Makes the World Wag

So accustomed are we to hear that "all mining is a swindle", that it is pertinent at this juncture when the more optimistic have it that Northern Ontario will

rival the Rand, to state that South Africa south of the Limpopo has fared rather nicely from its "swindles". It will be recalled that the discovery of diamonds was denounced by scientists as a hoax originating with land speculators; that the Rand was condemned as a superficial affair. A little gold was produced prior to Barberton and the Rand. A few "vagrant" diamonds were found prior to Kimberley. Yet, to September of this year, the Union of South Africa, the section south of the Limpopo river, had a mineral record of £1,022,000,000. Of that, £717,000,000 is credited to gold; £220,000,000 to diamonds, £54,000,000 to coal, and £23,000,000 to copper. Taking it roughly and in round figures at $5,000,000,000, and not forgetting that this valuation of the diamonds is for diamonds "in the rough", the purchasing power of that grand total of production may convince recalcitrant economists that the wealth of nations has not been impaired by the gold and diamond fields of the sub-tropics. More than three-and-a-half billions in gold, a nominal valuation of $1,100,000,000 for the diamond, and the etceteras, provide an objective for Northern Ontario mathematicians. Forty miles of gold reefs and a few creaters stirred up a good deal of trouble, and more than bubbles. "Every prospect pleases," and so forth.

Retribution Overtakes "Frenzied Finance"

"Tom" Lawson is in "Retreat". The inglorious "hero" of "Frenzied Finance"—of which, by the way, he was not the author—is disposing of his "Dreamwold" (aptly named) estate. Pending the sale, he is cloistered in Maine, declining further publicity, preferring solitude. So the Mills of the Gods have begun to grind. Whittaker Wright, Hooley, Bottomley, Lawson! Next! His career as a mountebank may not be at an end. At least he has evaded the fate of noted derelicts. The moral of it is, that such as Lawson can perform so long, but cannot escape retribution of justice. For a while it seemed as though he would seek to rehabilitate himself through Kirkland Lake areas. The daily press was inclined to hail his advent there as a harbinger of market furore. At present his address is "Somewhere", in Maine!

The Genesee "Find"

It may be as well to explain that the Genesee "find" of silver, in Bucke, is another evidence of intelligent deduction and exploration. Reasoning by the Nipissing Company's experience with one of its veins, where a contact condition proved the theory formed as to ascending solutions at that point, Kirkby Thomas, E. M., with all the data before him, advised that certain work be done. Above a certain depth there is no ore, thus far. Above the contact there is ore, not very wide but carrying satisfactory values. Evidently there is a section, approximately defined, well worth the attention it is receiving, and that is why Mr. Lyman and his people deserve hearty congratulations for their enterprise. The educational effects of the past few years, to say nothing of other resultant benefits, compensate for misadventures in other directions.

Mr. Elfick's Tragic Death

The cruel circumstances under which it occurred made the death of "Harry" Elfick the more deplorable. Found by the shore of the lake he was so fond of, he was the victim of flames which, like wild waters, are ever so ruthless. Mr. Elfick knew his Ontario from Fort William to James Bay, had seen the silver and gold lands of the North succeed the Rainy River and Lake O' The Woods, and had preserved his personal popularity and intimate relationship with the old timers and new ones.

Benefactions of Metal Producers

Were it not for the unrequited enterprise of mine-owners the bathos and phatos of this would be downright harrowing:

Sterling Silver Containers, ½ pint sizes	$42.50 to 59.50
Sterling Silver 14-kt. Gold Inlaid Containers, quart sizes for over-coat pockets	100.00
Quart size, in Sterling Silver,	65.00

Mineowners who make it possible to provide "hip oil." Containers, for universal use if need be, now the Volstead Act has been applied to all vessels entering American ports, are proving themselves to be "an ever-present help". The Luxuries of Life would be unspeakably far removed from both sexes, who find the Containers a vital part of their personal charms. If they must, then drinking "de luxe" is "au fait" only when they can reach for the receptacle and daintily decant the contents.

Some Gold Production Comparisons

To those who prate about the menaces of Mining it hardly is necessary to revive the adage that none dare to climb who fear a fall. For years there were Governments that regarded returns from Mining as perfectly legitimate loot. Sentiment, and with it the governmental view, has changed somewhat, however, and especially in Ontario there is growing appreciation of a Gold Industry that is excelling all others in degree. In connection with this, we have the expressed desire of mercantile interests for greater expenditures in the Northland upon public works, and the optimism pervading official utterances. The Ontario Department of Mines figures for the first half of the year make it more than ever apparent that the gold fields of the province are doing display advertising on behalf of the whole region.

The gold output in the January-June period was $9,845,910, of which, it is permissible to say, $5,866,902 came from Hollinger Consolidated. As the production for the corresponding months in 1921 was $5,761,504, it needs no emphasis to make it positive that the Hollinger alone surpassed last year's total for the half year. That being conceded, it may be observed without incurring resentment that the Ontario 1922 half-yearly record exceeds that of any State in the American Union, excepting California, in all of 1921. During the 1922 first half, California mines and placers sent $7,721,258 in gold to the San Francisco Mint and local smelters and refineries. Here, again, Ontario leads by $2,124,652.

Ontario's production in the six months exceeded by $1,847,410 that of Alaska, which was $7,998,500 in all of 1921. Moreover, to August 12, it is an outstanding fact that Hollinger Consolidated yielded $7,918,694.17, and accounted for $7,644,433.80, against California's $15,061,300 in 1921; Alaska's $7,998,500; Colorado's $7,347,800, and South Dakota's $6,523,000.

Why shouldn't the spirits of mortals hereabout be proud! In each current month Ontario is putting out gold in greater quantity than the State of Utah is annually. While Ontario in 1921 produced $14,624,085, and California $15,061,300, 1922 will notify a wider breach in favor of the Canadian gold fields.

Assuming Canada's 1922 total will be about $26,000,000, Northern Ontario may come within a million of the gold output of California and Colorado combined in 1921.

All of which is by the way.

The Mining Districts

by THE JOURNAL'S CORRESPONDENTS

ONTARIO

NORTHERN ONTARIO

(Special Correspondence)

Nipissing

Nipissing directors have declared the regular quarterly dividend of 3 per cent, together with a 3 per cent bonus, payable October 20th to holders of record September 30th. This will make a total of 18 per cent paid during the current year and will bring the total disbursements of the company up to $25,303,000. Production at the property is running high and 1922 should be the best year since 1915. For the whole of 1921 the company produced 3,000,000 ounces, while during the first six months of 1922 production amounted to 2,167,000 ounces.

During the week ending September 22nd, Nipissing shipped nine cars containing 704,000 pounds of residues to Deloro. The Mining Corporation shipped five cars containing 118,000 pounds, of which two cars went to Deloro, two to Thorold and one car to Perth Amboy. The O'Brien Mine shipped one car containing to 60,000 pounds to Deloro.

Good Vein at Pancake Lake

The Crown Reserve Mine is understood to have made an important discovery on its Pancake Lake property in the Larder district. The main shaft was being sunk to 300 feet and at a depth of 275 feet a 4-foot vein, carrying extremely high values, was encountered. This appears to be a new vein, which does not outcrop on the surface and channel samples taken across the 4 feet have shown values running into the hundreds of dollars. Officials of the company consider it to be a very important discovery.

The option on the Eleanor Dunkin claims in Gauthier, which has been held by New York interests, has been dropped. It is understood that results to date had not been sufficiently encouraging and that heavy payments were due under the terms of the option.

Another gold discovery has been made in the Township of Catharine on the property of the Van Arnon syndicate. Stripping has uncovered a vein about four feet wide carrying native gold.

Arrangements have been made for the financing of further work on the Hunton Kirkland.

Extensive improvements have recently been completed on the surface equipment of the Canadian Kirkland. The shaft is down 300 feet and will be sunk to the 400 foot level, where a level is established.

It is understood that negotiations are under way for the sale or control of the Queen Lebel. This property was recently under option to English interests, but the option was allowed to lapse.

The Harvey Kirkland has about completed its power line to the property from the Montreal Ontario. An electrically driven plant has been purchased and is on the way to the property, so that underground operations should be resumed within a few weeks.

It is officially stated that Porcupine Crown has no immediate intention of resuming milling operations. The new vein near the Hollinger line is being developed at the 500-foot level and a winze will be sunk to 600 feet.

The McEnaney Mine is being unwatered preparatory to an examination and the laying out of further development work.

The management of the Davidson has decided to sink a three compartment incline shaft to a depth of 1000 feet. This is the first incline shaft for any of the Northern Ontario gold mines.

Dome directors have declared the usual quarterly dividend of 50 cents a share, payable October 26th to holders of record on October 6th. No capital repayment was announced, but it is expected that this will be made with the January disbursement.

Plans are under way for the building of a memorial to Benny Hollinger, the discoverer of the famous mine which bears his name. The estimated cost of the memorial is $10,000, and it will be erected on a prominent place on the Hollinger property.

A party of about 40 business men and members of the Toronto Stock Exchange have just completed a trip to Cobalt, Porcupine and Kirkland Lake. It is a good sign for the future of the mining industry in this Province when representatives of important bond and brokerage houses display as much interest as these men have done.

High-Graders Caught

To date five arrests have been made in connection with the theft of gold precipitate from the Kirkland Lake Gold Mines, the two latest being Carl Beswick, solution and refining man at the mine, and John Shaw, who is supposed to have assisted Ed. Deane in disposing of some of the precipitate. Shaw is understood to have broken down under the strain and is now in the asylum. Beswick, Donnelly, Kleiser and Shaw have all made confessions which implicates Deane as being the head of the organization. It is understood that the thefts from the Kirkland Gold run into quite large values, Beswick having admitted receiving approximately $20,000 as his share, and he has already made restitution to the extent of $13,000. Beswick and Deane came up for preliminary hearing in Haileybury on September 30, and it is understood that they will be tried in the near future. The scheme by which precipitate was stolen was a very clever one. Beswick, in addition to being solution man at the mill, had charge of the melting down of the precipitate. In taking the daily samples of the pregnant solution for assays, this was diluted a certain percentage. Beswick keeping track by a system of book-keeping, and a corresponding amount of precipitate was taken. The Kirkland Lake Gold has had a hard struggle to make

ends meet since it commenced milling, and as Beswick admits having carried on his operating for almost two years, the amount stolen would represent the difference between profit and a loss. It is understood that operations were not confined only to the Kirkland Gold, and that other arrests may be made in the near future.

The mystery of the disappearance of a gold brick stolen from the McIntyre Mine in Porcupine about 10 months ago, has finally be cleared up. At the time the brick was stolen a chore-boy at the property was under suspicion. Detectives, however, finally came to the conclusion that he was innocent, and he subsequently returned to his native home in Italy. A woman, who lived in the same town in Italy, wrote a letter to a friend of hers, whose husband worked at the McIntyre, and referred to this man and to his apparent prosperity, and she seemed to think that Ontario must be a very fine place, when a poor man could go there and come back a rich man in a short time. This letter came to the attention of the McIntyre officials, who immediately started an investigation which resulted in the arrest of the man in Italy and two other men in Porcupine, and also in the recovery of a part of the gold.

NORTHWESTERN ONTARIO

Spar Island Being Examined

Many of the older mining properties in the Port Arthur area are attracting the attention of mining operators and investors, with a view to their further exploration and operation. Modern mining practice is so far in advance of that of the old days, particularly in the recovery of values, that an interest attaches to these mines that was absent under former operations. A party of mining capitalists, accompanied by Capt. H. E. Knobel, E. M., are at present engaged in making an investigation of Spar Island. This island forms a part of the Prince Location situated about 25 miles south of Port Arthur on the shore of Thunder Bay.

The Prince Location was the first mining claim taken up on the North Shore of Lake Superior, being located for copper for the old Montreal Mining Company in 1845. It was operated during 1846 and was closed down in the winter of 1846-47. Good results were obtained in both copper and silver. These operations were carried out chiefly on the mainland and consisted principally of tunnelling ad drifting together with a shaft on Spar Island. The expense of carrying on mining operations in those days was excessive. Men and supplies had to be brought from Montreal, up the Ottawa and French Rivers, across Lake Huron, up the Sault River, and around the North Shore of Lake Superior in batteaux to the property.

Since that date some attempts have been made to open up this property, but nothing in the way of systematic development has been undertaken. It has an area of 6,400 acres.

Schreiber Claims Optioned

Lewis Fenning, E. M., of New York, who optioned fourteen claims in the Schreiber district, has made a cash payment of $25,000, and is about to let a contract for 200 feet of shaft sinking. These claims are owned by Messrs. Estall and Boswell of Schreiber.—J. J. O'Connor.

BRITISH COLUMBIA

Premier Dividend

The Premier Gold Mining Company distributed its fourth dividend amounting to $750,000 on the 1st of October. The total distribution aggregates $2,400,000, or a return to shareholders of almost half their investment in nine months. Since the begining of the year the Premier Mining Company has been shipping each month some 3000 tons of high grade ore, running about $80. a ton; 3,000 tons of medium grade, running about $35. a ton; and it has been milling between 3000 and 4000 tons of lower grade ore in its concentrating and cyanide plant. It is estimated that the mine has been turning out ore to the value of $400,000 each month, the high grade and concentrate going to Tacoma Smelter and the medium to the Anyox plant, Granby Consolidated.

Fish Creek Mine to Rival Premier

Dr. Lachlan McMillan, a director of the American Mining & Milling Co., states that the Fish Creek Mine, Salmon River, is going to be one of the "wonder mines" of northern British Columbia. He is convinced that there will be ten properties in the Portland Canal shown to be as important as the Premier Mine.

Big Missouri

The force of men employed on the Big Missouri has been doubled. It is hoped that a road, now under construction, will be completed this fall so that ore may be shipped over the snow during the winter.

Homestake

A. C. H. Gerhardi will have charge of operations in connection with the resumption of development on the property of the Consolidated Homestake Mining & Development Co. Ltd. This is situated at Kitsault Glacier, Alice Arm. There has been a delay of some months because of litigation now settled.

Rich Copper Ore

Some samples of high grade copper ore have been brought from the Horse Shoe Gromp of Claims, McGrath Mountain, Alice Arm. It is said that a vein containing exceptional values has widened from 16 inches at the surface to nearly 3 feet at a depth of 10 feet. Transportation facilities must be improved to permit extensive development.

New Mine for Hazelton District

Dome Mountain mineral prospects, Hazelton District, have been attracting much attention of late. J. D. Galloway, resident engineer, seems convinced that T. J. Jefferson will have a mine. The showings are satisfactory and developments are improving them. On Hudson Bay Mountain the Duthie interests, having purchased the Henderson Property from J. K. Ashman, have placed Captain Turner in charge and high grade ore is being shipped regularly. It is rich ore and is opening up as work continued. At the present rate the investors should soon have their disbursement returned with interest.

Placer Gold Near Usk

A strike of placer gold on Kleanza Creek, about three miles from the town of Usk, G. T. P. Ry, is announced. Two French prospectors are the discoverers. They brought a nugget, thumb size, into Usk and the rush started. The greater part of the ground in the vicinity of "discovery" has been staked. It has been generally understood for some time that a good deal of native gold could be found in the glacial drift of this Creek and some panning has been done before with good results.

Geologist's Report on Cariboo

Dr. W. A. Johnstone, of the Canadian Geological Survey, who has spent the summer in the Cariboo, is quoted as saying that the Cedar Creek Mining Co., operating two rockers on the ground near "discovery", took out $5,985 of gold in six days. He states: "Developments recently have shown the occurrence of pay gravel at several places and particular along the south west bank of the small depression in which the original discovery was made. Somewhat similar gravels have been found at several points on the Platt and Sheridan Claims but it is not quite so rich. There are three rockers at work on the Platt Claims and from two to three ounces per day is being taken. On these claims it is found that the gold is in the gravel and not in bedrock. Prospectors should look for the red gravels beneath the glacial drift and lying on bedrock."

Dr. W. L. Uglow, who also had a geological survey party in the Cariboo this summer, states that unless lode mining starts in the hills near Barkerville the camp will die. There is some hydraulic work being carried on but not on a large scale. He thinks that the quartz veins of the district warrant investigation.

T. H. Kerrush, who is developing the Nip and Tuck Mine, has exposed three veins of silver-lead ore, two carloads of which are ready for shipment to trail. The government is building a trail to the property.

Several hundred pounds of samples of gold, silver and copper ores taken from the Whitewater District B. C., are on exhibition at the Chamber of Mines, Vancouver. Returned prospectors state that they have located large high and low grade ore bodies in this comparatively little known section of the Province.

The King Kaco Mining Co., holding bonds on properties situated on the north fork of Lemon Creek, Slocan District, and consisting of a small group of business men of Goldendale, Washington, is installing an experimental plant to treat some 10 tons of ore a day. During the summer four miles of trail have been opened up and machinery hauled over rough country, crossing an elevation of 7000 feet. From present indications the enterprise of the investors is likely to be rewarded.

The Wild Horse Dredging Company, using a modern dragline [illegible] has commenced dredging the main channel of Wild Horse Creek. The Gamble Mining Company [illegible] adjoining those of the Wild Horse Company [illegible] being forced to close down probably until next [illegible]. E. W. Watson, engineer in charge, explains that [illegible] of the flumes have been carried away by [illegible] which undermined the support [illegible] and it will not be safe to allow the sluice [illegible] to be replaced until [illegible] In all 1000 feet of virgin ground [illegible] will be proved up by hydraulicing with 3000 feet [illegible] available.

J. H. Hedley, provincial secretary of B. C. Prospectors' Association, announces that this organization will be in readiness to advise the provincial government as to mining legislation needed and that which should be considered at the forthcoming session of the legislature.

The Granby Bay Mining Co. has been reported to have encountered a large body of low grade ore on its property.

The management of the Dean-Lammon Mine, Hartley Bay, expects to be making regular shipments to the Anyox smelter [illegible] Company the next December. Some considerable tonnage of high grade ore have been opened up and new machinery has been installed including a 120 h.p. [illegible] air compressor.

The construction of the new reinforced concrete mill building of the Britannia Mining Company, Howe Sound, is well in hand. Most of the machinery is ready for installation and development continues on the Victoria Claims of the Company with assurance of new large bodies of ore in reserve.

Receipts of ore and concentrates at the Trail Smelter, Canadian Consolidated Mining & smelting Co., passed the 300,000 mark during the week ending September 21 last. In the lattter period 10,028 tons were received bringing the aggregate for the year up to 306,633 tons. At the corresponding date last year the total stood at 299,510 tons. For the last week recorded the receipts in detail were: Black Rock, Northport Wn., 113 tons; Quilp, Republic Wn., 321 surprise, Republic Wn., 297; Lincoln, Blaylock, 23; Noble Five, Sandon, 63; Bosun, New Denver, 49; Silversmith, Sandon, 199; Standard, Silverton, 43; company mines, 8920.

NOVA SCOTIA

Agreement Signed at Last

It took four days of negotiating in the last week of August to reach an agreement between the Dominion Coal Company and the executive of the United Mine Workers. The general terms were set out and on this understanding the striking miners returned to work. But it has taken over a month to settle the outstanding greivances of the different collieries and the signing of the agreements has been as a consequence long delayed.

It may be difficult to the lay mind to understand that conditions in a coal mine have more to do with earnings than has the price paid to the miner for digging his "darg" of coal. Given good conditions and a fair ton rate the miner has little cause of complaint. But working conditions change so quickly at times that adjustment is always provided for. It is difficult to provide for imaginary grievances, and these, under the agitation stimulated by the executive of the mine workers most of the year, had accumulated in large numbers. Indeed when it came to a discussion of the main features of the agreement, it was found that these were easy compared to the mass of details that already had been waded through. The affixing of the signature of the executive of the mine workers took place on Saturday, Vice President MacDougall being present.

Large Coal Shipments

September coal outputs were large and there were days when the tonnage climbed over the 14,000 ton mark. Shipments to the United States have ceased but the Montreal market will absorb a large amount of coal and by the time shipping ceases that district ought to be well supplied. The coal heap has not yet been all shipped away but brisk business should see its removal very soon. With the Steel Company using more coal and a good demand from outside the outlook to the end of the year is bright.

Education for Workers

In the labor world, Mr. Woodsworth, M.P. [illegible] series of lectures to working men which were [illegible] well attended. Meanwhile the effort to start an educational movement among the colliery workers is being publicly discussed and arrangements have been made to a course of lectures during the winter.

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Valuable economic minerals, of which the people of this country as a rule have little knowledge, are distributed in various sections served by the Canadian National Railways. The field of utility for these minerals is constantly expanding and entering more and more into the realm of manufacture.

Information on this subject can be obtained by writing:—

The Industrial and Resources Department Canadian National Railways

TORONTO :: ONTARIO

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Buyers who are unable to find in the classification here given such machinery or supplies as they desire are invited to write Service Dept., Canadian Mining Journal, Gardenvale, Que., who can in all probability, refer them to proper sources.

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EDITORIAL

Inhabitants of the old world live and thrive in a much more rigorous climate than is found even in the coldest parts of northern Canada, and therefore the climate does not offer any insuperable objection to settlement if minerals or ores are anywhere found in paying quantities. — J. B. Tyrrell—1908.

LABRADOR FIELD FOR ADVENTURE

Time and again it has been pointed out that a large fraction of Canada's territory is unfit for any human pursuit with the exception of mining. Of no part of our Dominion can this more truly be said than of the vast peninsula of Labrador, even the coasts and fiords of which have been only superficially explored. A handful of explorers, principally geologists, have travelled a few of the larger rivers, and have made infrequent traverses of the peninsula—a peninsula a thousand miles broad, from the Straits of Belle Isle to Hudson's Bay, and seven hundred miles deep, from Cape Chidley to the Gulf of St. Lawrence.

What reward Labrador holds in store for the prospector is still a matter of conjecture. The meagre geological data gathered up to the present demonstrate a variety of pre-Cambrian rocks and periods of igneous intrusion that promise well. Dr. Coleman, who examined parts of the east coast in 1915 and 1916, reports areas of rocks of the Keewatin and Grenville series, with later sedimentaries that may be Huronian and Temiskamian in age. Rocks of these ages contain the ore deposits that have made Ontario's mining famous throughout the world. It is only logical to conclude that a similar result will be attained eventually in Labrador as daughty adventurers penetrate its fastnesses and discover its secrets.

To date we publish an account by Mr. William M. Agar, a young American mining engineer, of his visit to Labrador in the summer of 1921. His photographs, as well as his vivid description, show a land eminently suited to the search of the prospector. The coast is famous for its rugged cliffs on which no blanket of soil or vegetation can rest to obscure the vision of geologist or prospector. Inland the highlands are similarly bare, though the valleys provide sufficient growth of timber for shelter and fuel. Fresh water is available in every valley. Fish are abundant in both fresh and salt water, but the game provides only a precarious food supply.

All told, the features of Labrador drawn by explorers connected by railway are not at all unattractive. If, as is periodically asserted to be the case, there should be found gold placers in the regions left unaffected by the sweep of the glaciers, there is nothing to prevent a rapid and consistent development not only of such deposits, but of whatever other minerals might be disclosed in this least known of Canada's territories.

PORCUPINE'S NEED

Seven years ago the Ontario Department of Mines caused to be printed and distributed a geological report on Porcupine, accompanied by two maps. Since that time, like the immortal commender of Pears' Soap, we have used no other. It is now practically impossible to secure copies of the report or of the more useful of the two maps.

It were a work of supererogation to dwell upon the importance of Porcupine to Ontario and to Canada. Why the Ontario Department of Mines has not, long ere this, given it the attention it deserves, is one of those mysteries that must remain unsolved. Here is a mining camp that has given to Ontario a wealth of publicity and has added to the Provincial exchequer many shekels of gold. Investors on both sides of the Atlantic keenly desire to take their chances in this region of notable performance and of even more promise.

Thus for seven long years Porcupine has played the part of Jacob to the Province's Laban. Jacob, if we remember rightly, had to resort to a very questionable expedient to get what was coming to him. But Laban's role is not one that reflects credit upon the Province.

It is reassuring that the Department of Mines has this year sent Mr. A. G. Burrows, one of the most capable of the younger generation of Canadian geologists, to Porcupine to collect and collate geological data and to supplement the results of the first diagnosis. Unaided, Mr. Burrows should be able to complete his maps and report within the next Jacobean period of probation, another seven years.

Infinitesimal as seven years may seem when contrasted with the geologic eons that Mr. Burrows must deal with, yet to us ephemeral humans it is a long, long time. Most respectfully we suggest to the Premier and his colleagues that they can well afford to appropriate for the work of bringing Porcupine's geology up to date a small fraction

of the amount spent on enforcing the Ontario Temperance Act. The results would certainly be less problematical and most assuredly would create more enthusiasm for our administration throughout the north country.

In all this we wish to state explicitly that we cast no blame upon the Ontario Department of Mines. It is beyond all question that the Department is and has ever been fully cognizant of Porcupine's need. It seems equally certain that it has been rendered incapable of action by reason of inadequate appropriations. There is no other conceivable reason.

We hope, then, that this winter we shall see Mr. Burrows' hands strengthened by a number of competent assistants and that no effort will be spared to make available to the public next summer a thoroughgoing report on the Porcupine of today.

But the Departments' most strenuous efforts will be of no avail if something in the way of a thistle be not placed on or near that part of the King's Printer's anatomy where it will do most good.

GEOLOGIST, PROSPECTOR, AND ENGINEER

More and more our geologists give heed to the practical needs of the prospector and the miner, just as the prospector and the miner gain, year by year, added respect for the utility of the geologist and his deductions. A notable example of this ever-increasing mutual regard is contained in Mr. C. W. Knight's report on the *Lightning River Gold Area*, which appeared in our issue of last week.

In discussing the general occurrence of gold ore in Northern Ontario, Mr. Knight draws attention to its association with either of two great belts of sedimentary rocks of Temiskamian age. His advice to prospectors is, "explore for feldspar-porphyry and quartz-porphyry intrusions in or near these great belts of sediments." So sure is Mr. Knight of the importance of this association of Temiskaming sediments and later intrusives that he is ready to recommend intensive exploration in that part of the Lightning River area where the two rocks occur together, though the actual gold ore-bodies found up to the present are in themselves no more than fairly promising. At the same time Mr. Knight draws attention to another area of Temiskaming sediments 25 miles to the north, that has not yet received the attention it deserves.

A very few years ago the geological conditions that have resulted in the deposition of gold in the various fields of Northern Ontario was completely an enigma. Little by little, the information collected by geologists and engineers in both public and private employ is being pieced together to form a logical whole. Theories once accepted are now discarded in favour of ideas more in accord with observed facts. The present accepted theory is so nearly in accord with fact that it is actually useful in directing exploration and prospecting. Much money is being spent on the score of geological deductions. We hope the event may prove it to be spent wisely.

But geological theories usually fall short of perfection. Our ideas as to the reasons for the deposition of gold in the veins whose output has put Ontario's gold production on a sure footing is still a matter of conjecture. The engineer is not yet able to trust implicitly the deductions of the geologist. It still remains to some extent a case of "where she be, there she be."

We expect to be able shortly to throw added light upon the occurrence of gold in Northern Ontario by means of some geological studies that have been proceeding for some years in the Porcupine camp. The deductions from these studies will not solve all the problems of the miner, geologist and prospector in the gold fields of the north, but we expect that they will at least give rise to some profitable discussion.

ONTARIO'S IRON ORE COMMITTEE

Hon. Harry Mills, Minister of Mines for Ontario, has announced his selection of the following committee to investigate the commercial possibilities of mining iron ore in Ontario: Prof. H. A. Guess, professor of metallurgy, University of Toronto; Prof. H. E. T. Haultain, professor of mining, University of Toronto; Mr. J. G. Morrow of the Steel Company of Canada; Mr. G. S. Cowie of the Mines Department, Algoma Steel Corporation; Mr. Lloyd Harris, of Brantford; and Mr. Hall, of Montreal, the last two to represent the transportation and commercial aspects of the case.

While it is highly satisfactory that the Department of Mines at Toronto has interested itself actively in the iron ore problem in this way, the personnel of the committee, as announced, is distinctly disappointing. It is composed of a group of technical and financial specialists prominent, and even eminent, in their respective lines. Unfortunately, however, not one of them is a specialist in iron ore, though a number are keenly interested in iron ore and have followed closely the developments in the situation from year to year. We were led to believe that the Minister of Mines intended to employ the services of such a specialist. No specialist on iron ore has been included in the committee, and we are disappointed.

The iron ore problem has beset us continuously since our modern iron and steel industry was instituted. Numerous and determined efforts to solve the problem have been made, but so far without success. Many commissions and committees have investigated and reported, without practical result. We proceed anew to observe and to argue, and can continue so to do "ad infinitum" with the same result as before. In the present case it appears that we shall follow the old, beaten track, which will lead us inevitably to the same goal as heretofore—which is exactly the spot from which we started.

There is needed a new plan of attack on this problem. Our iron ore problem in Ontario is not exactly similar to that of any other district, and no course of mere observation of the results in other fields will serve to provide a

solution for our case. The human effort that has been and is being expended in these other fields to ensure a successful issue must be paralleled, though not duplicated, by similar human effort expended on our own problem. A consultative committee is not capable of expending this effort. The committee is, in this case as usual, composed of men well occupied in their special professional work, who can spare only a small fraction of their time and effort for the committee's work. Even if they should stretch a point and neglect a part of their regular duties in favour of iron ore, the problem will not have that whole-hearted and continuous attention without which, we are convinced, even a board of iron ore specialists would confer in vain. The members of the present committee are to be commended for the public spirit that has impelled them to accept this charge; we wish there were some prospect of success more in keeping with their sense of duty to the public cause.

The fact is that, as we have in Canada no iron ore industry, so we have here no all-round specialists in iron ore. If we wish to have the soundest professional advice on our present problem, we must either call in a specialist from outside and give him the facilities and the time to acquaint himself with Canadian conditions, or, on the other hand, we must give to a Canadian engineer or geologist already thoroughly acquainted with the case in Canada an opportunity to study and assimilate the information and ideas that are to be gained abroad. A man thus prepared to study our iron ore problem can logically be expected to find its solution. Anything less than this is trifling with the question.

EDITORIAL NOTES

Two weeks ago we published Mr. Axel Estelle's account of his process for making iron and sulphur from sulphide ores. Today we have Mr. Mason's resumé of the case, with particular reference to the experimental work at Trail, B.C. Soon, we hope, there will happen that happy conjunction of inventive genius, far-seeing executive ability and available capital that is the pre-requisite to the success of any such new commercial undertaking.

We note today in another place an occurrence of asbestos in Australia of an unusually high grade both in its quality and in its admixture with the serpentine rock. If further prospecting and development should disclose veins of this high grade ore (20 to 50 per cent. fibre) of larger size than those found up to the present, the district might become a serious competitor of our own in Quebec.

The great electrical development scheme of the State of Victoria, Australia, now under way, is based upon brown coal deposits of vast extent. The Morwell field, where the present plant is in course of erection, has been shown to contain at least 5,000 million tons of fuel. In the Traralgon field, 5,600 million tons has been determined. There are other similarly large deposits of this lignite throughout the State. It seems possible that, as the requirements for electric power on the western prairies become greater, our own lignite deposits in Saskatchewan and eastern Alberta will be put to a similar use, possibly with high-grade fuel as by-product.

HIGH-GRADE ASBESTOS IN AUSTRALIA

In the annual report of the Geological Survey of Western Australia, an occurrence of asbestos is described in some detail. This is at Lionel, near Nullagine, in the northwestern part of the state, 100 to 150 miles from the coast and on the outskirts of the Great Sandy Desert, and just north of the Tropic of Capricorn. The Pilbara gold field is in the immediate vicinity.

Serpentine rocks outcrop at intervals for 200 miles, from Roebourne, on the coast, to Nullagine. At Lionel "the serpentine mass is traversed by silicified bands which stand out plainly like narrow dykes and also by shear zones which are inconspicuous at the surface. In these latter chrysotile asbestos of the highest quality is developed. These asbestos lodes where seen were found to be from two to six feet wide and to consist of innumerable parallel or anastomosed veins divided by narrow lenticular masses of the massive serpentine rock. . ."

"Owing to the rapid variation in the width of the veins it is impossible to give an average length of fibre, but only a small proportion appears to be under half an inch in length. The proportion of marketable fibre in the lodes seen varies from 20 per cent. to 50 per cent. of the whole mass. . ."

"The deposits are mostly small high grade rather than big, low-grade propositions.

"The fibre is superior in quality to any other found in Australia, and compares quite favourably with that in any other part of the world, with the possible exception of the best Canadian.

"Asbestos mining must be regarded as being quite in the initial stages, and the prospects of establishing the industry in the state are very encouraging. A number of the deposits have quite recently been prospected and further search will almost certainly disclose other occurrences."

It is recommended that platinum and osmiridium (worth £16 and £23 an ounce, respectively) which are found only in association with serpentine rock, should be searched for carefully in this area.

THE PROF.

No one could actually be so wise
As that chap looks. His noble brow, his eyes,
Seem made for thought and deepest cogitation
His whole demeanour stirs imagination
To body forth a study and large tomes
His head is twice as large as common domes

* * *

Now he approaches, hitherward doth come—
God bless my soul! The prof. is chewing gum!

J. C. M.

Iron From Pyrrhotite

BY F. H. MASON

S. G. Blaylock, managing director of the Consolidated Mining & Smelting Company, announced at one of the sessions of the Northern Mining Convention, held at Nelson, B. C., on July 3 to 7, that a very pure iron had been made electrolytically in the company's laboratories at Trail from the tailing from the dressing of the Sullivan mine ore.

Though the invention is in only the laboratory stage at the present time, it is one that has far-reaching possibilities. The officials at Trail are not prone to make announcements of the results of laboratory experiments unless there is reasonable hope of commercial achievement behind them, and it is hardly likely that Mr. Blaylock would have made so important an announcement at a public gathering unless he believed that ultimately a commercial process might be evolved from the invention. The laboratories at Trail, too, it is well to call to mind in passing, already have an unusually honorable record of achievement, for in them the electrolytic process that now is turning out 150 tons of zinc daily was conceived, as, also, was the mechanical process now in use for dressing the exceedingly complex ore from the Sullivan mine.

The Sullivan Ore

Sullivan mine ore is a compact sulphide ore, composed, essentially, of zinc-blende, marmatite, galena, pyrrhotite, pyrite, small quantities of other sulphides, and three to six per cent. of gangue. On an average probably more than half of the ore is pyrrhotite. In dressing this ore in the 1,000 ton plant now in operation at Trail part of the galena is removed on tables: the tailing from the tables is ground finely, and most of the remainder of the galena and the zinc minerals are separated by selective flotation, the pyrrhotite, pyrite, and gangue flowing away as a tailing.

The Consolidated Mining & Smelting Company is now constructing near the Sullivan mine, at Kimberley, B. C., the first 1,500 ton unit of a concentrating plant modelled on the lines of the one now in operation at Trail, and it is expected that the first unit will be completed early next year. When this unit is in operation some 750 tons of pyrrhotite, having an iron content of about 60 per cent. will flow away daily in the tailing, and thus some 450 tons of iron will be lost per day. If a reasonable proportion of this iron can be economically reduced from the tailing and put to useful purpose it will be an exceedingly valuable achievement, especially as at the present time there is no iron and steel industry in British Columbia, and both metals have to be brought long distances, the freight charges adding immensely to their cost.

Former Experimental Work

The reduction of iron from pyrrhotite in Canada is not new. At the beginning of this century a large number of experiments were carried out under the direction of Eugene Haanel, at that time director of the Mines Branch of the Canadian Department of Mines, with a view to producing a nickelferous pig iron, from which to make nickel steel, from the Sudbury nickel-copper pyrrhotite ores, thus avoiding an annual loss of three to four hundred thousand tons of iron in the slags. As a culmination of these experiments, the late E. A. Sjostedt produced 168 tons of nickeliferous pig iron in an electric furnace, at Sault Ste. Marie, Ontario. Ore unusually low in copper was selected for the purpose of this test: it was roasted to 2 per cent. sulphur, and reduced by charcoal in an electric furnace at the rate of one and one-third tons per day. The average requirements for the production of a ton of pig were two tons of roasted ore, one and one-half tons of limestone, sixty bushels of charcoal and forty pounds of electrodes, and the resulting pig contained 4 per cent. of nickel, 0.8 per cent. of copper, 0.01 percent. of sulphur, and 0.03 per cent. of phosphorous. The figures are taken from the official report of the experiments, issued by the Department of Mines. At the time, however, metallurgists had such an ingrained objection to the presence of even the smallest quantity of copper in structural steel that no one could be induced to entertain the use of this material, though samples of the pig were sent to the leading steel manufacturers in the United States and in Great Britain. When Sjostedt died he was still working on a process for the removal of the copper from the ore before it was smelted.

G. M. Colvocoresses did an enormous amount of laboratory and small-scale experimental work on similar lines, but he, too, found the copper content of the resulting pig and steel—for he had some pig manufactured into steel—the stumbling block that barred the way to success.

The Benefits of Success

With the perfecting of the flotation process it is probable that the copper content of the Sudbury ore could be so reduced that the amount of copper going into the pig would be too small to be considered detrimental to the metal. Besides, of late years metallurgists have moderated their opinion with regard to the harmful effect of small quantities of copper in nickel-steel. If, then, Mr. Blaylock and his staff at Trail should succeed in evolving a commercial process out of the present laboratory experiments it is likely that the Sudbury district of Ontario may gain as much by the inventions as the Kootenay region of British Columbia.

Mr. J. V. N. Dorr, who has recently returned to New York from abroad, states that he was impressed by the way the Germans are buckling down to hard work. He believes that this "will to work", combined with their well-known precise workmanship and thrift, will go far to rehabilitating their country rapidly.

Dr. Bruce Rose, recently with the Whitehall Petroleum Corporation in India, has returned to Canada and has joined the staff of the Departments of Mineralogy and Geology of Queen's University Kingston.

The Joint Peat Committee have made in their experimental operations at the Alfred bog during the past summer over 5,000 tons of first-class fuel. It has been distributed quite widely throughout the surrounding district at a price of $5.00 per ton, f. o. b. Alfred, Ontario.

The consumption per capita of Portland cement in the United States during 1921 was 0.87 barrel.

The East Coast of Labrador

By WILLIAM M. AGAR

To most of us the name Labrador is synonymous with desolation. The seven hundred mile stretch of rocky, barren coast reaching north west from Cape Charles, in the Straits of Belle Isle, to Cape Chidley, at the mouth of Hudson Straits, blocked with ice for nine months of the year, is less known than the interior of Asia, and the center of this vast area is for the most part wrapped in mystery. During the last thirty years a number of expeditions have penetrated the heart of the country. In 1895 A. P. Low published the results of his explorations in the interior and on the shores of Ungava Bay in the report of the Geological Survey of Canada, Vol. VIII, and in 1903 a party of three led by H. H. Prichard, F.R.G.S., crossed the great interior plateau. R. A. Daly accompanied Dr. Dallabarre on the "Brave Expedition" in 1899 and made a reconnaissance of the coast; and Dr. Grenfell, who for thirty years has served the fishermen of Labrador and northeastern Newfoundland, has found time in the midst of his manifold labor to explore and chart much of the northern half of the coast. The best charts of this northern region can be obtained only from him, as he has not seen fit to publish many of them.

A. P. Coleman of the Canadian Geological Survey examined parts of the coast between Mugford and Komaktorvik during the summers of 1915 and 1916. His report, "Northeastern Part of Labrador and New Quebec," Memoir 124 of the Canadian Department of Mines, is by far the best treatise of a scientific nature known to the writer for this particular section. Professor Daly's article "The Geology and Scenery of the Northeast Coast", in the book "Labrador" by Dr. Grenfell and Others", is more general. It is remarkably interesting and very suggestive. The reader should turn to this book for the best available information on the people of "The Labrador" and all phases of their life and occupations. Besides the above mentioned articles Professor Daly has published the results of his personal reconnaissance of nearly the whole length of the coast in the Bulletin of the Museum of Comparative Zoology at Harvard College, Geol. Series, Vol. II, No. 3. Together with this work and that of several other parties and collectors most of the coast remains imperfectly charted and the interior little known.

A Land for the Adventurous

During the summer the writer accompanied Dr. Grenfell, Mr. George Williams, and Mr. James Wells of Hartford, Connecticut, on board Mr. Williams' schooner yacht "Nascopie" on a trip along the Labrador coast as far north as Saglek Bay. Shortness of time together with adverse winds or no winds at all prevented our landing at many points of interest and made the collecting of any geological data very difficult. It is hoped, however, that even these sketchy notes, concerning as they do an almost unknown land, will be of interest, and that this article, by putting Labrador in the minds of its readers, may perhaps induce some in quest of an untouched land to explore, new rivers to fish, or a little known coast to cruise, to come in contact with coast scenery unparalelled on the east shore of North America and ranking among the finest in the world.

The Newfoundland government boats, which make a number of trips along the coast from July to October, are small and the accommodation is poor. One boat makes the round trip from St. John, Newfoundland, to Hopedale, Labrador, in roughly two weeks; and a second boat from Hopedale to more northerly ports in ten days. This second boat generally reaches Cape Chidley twice in a summer. The two do not connect.

The steamers skirt the coast and wind their way among the hundreds of islands lying off shore. They offer a splendid opportunity to get a general view of the coast, but they do not enter the bays and fjords that are inhabited. To see these latter a boat must be hired from a white settler or an Esquimau. Owing to the fact that all the inhabitants are engaged in the fishery during the summer months, arrangements should be made beforehand by mail either through the Grenfell Mission hospitals at Battle and Indian Harbors, or the Moravian stations at Hopedale, Nain, and Hebron.

Northwest Shore of Mugford Tickle, Labrador—2500 to 3000 feet high
Note Iceberg in right foreground

A Mountainous Coast

The Labrador coast along the whole of its length consists of a succession of bays and barren, rocky headlands, with generally a fringe of islands of diverse sizes lying off shore. This island border varies in width from nothing to more than twenty miles.

South of Ford's Harbor, at the mouth of the Nain Run, the altitude of the shore line and islands lies between two hundred and eight hundred feet, with the Mealy Mountains in Hamilton Inlet, two thousand feet high, and the range back of Cape Harrisson, two thousand two hundred feet high, as the only conspicuous elevations. North of Ford's Harbor the general height averages well above one thousand feet and a succession of mountain ranges rise up out of the sea between three thousand and six thousand feet.

Icebergs are a striking feature of this coast. All the way from northern Newfoundland to Cape Chidley the towering pinnacles and the rectangular forms of the many shaped "bergs" line the seaward horizon and drift close inshore on their steady journey southward. They are most numerous in the late spring, though some remain throughout the short summer as sentinels, guarding the silence of that land and giving a suggestion of wonders to be seen.

General Geology of the Coast

The rocks of the Labrador coast are chiefly highly contorted Archaen gneisses and schists composed of metamorphic sediments, with a striking lack of limestone, and intrusives of granitic and syenitic nature with local masses of anorthosite. This complex is intersected by numberless intrusions of pegmatite which appear to be strangely unproductive of well crystallized minerals.

Unmetamorphosed or very slightly metamorphosed gabbro and basalt intrusives are very common at some points and are sometimes followed by a second series of granitic pegmatites.

These and the slightly folded Pre Cambrian sediments of the Kammajet Mountains complete the rock types.

The Quaternary ice caps have left many marks of their presence. They will be discussed further along.

Battle Harbor, near the southeast tip of the penninsula, is a small settlement lying along the shores of a narrow tickle between two islands. These islands are composed of various gneisses. The smaller one, Battle Island proper, is intersected by a series of serpentinous pegmatite dikes and veins composed almost entirely of quartz and pink felspar with rare tabular crystals of hematite. These dikes vary from several feet to a fraction of an inch in width, the smaller ones in particular have very sharp boundaries and form wavy, pink lines in the dull grey gneiss.

Battean Harbor lies about forty miles north of Battle. There are many rocky islands hereabouts lying from 100 to 300 feet above sea level. They are very rough though slightly rounded by the ice and the stoss and lea topography is developed on a large scale. The country rock is a contorted injection gneiss cut by many quartz and pegmatite dikes and by a later coarse-grained, unmetamorphosed diabase. This latter occurs as large dikes roughly fifty to two hundred feet thick and is in turn cut by a few pegmatite dikes. There are several wave-cut terraces on the outer shore about one hundred feet above the present sea level.

Indian Harbor, about 120 miles north of Battean, is a narrow tickle between two islands off the mouth of Hamilton inlet. Many unmetamorphosed basic dikes are a prominent feature here. The high rock back of the Grenfell Mission station is a dike which, when viewed from the proper angle, shows the almost perfect profile of an Indian head.

The Ancient Peneplain

The distance from Indian Harbor to Hopedale is 140 miles. Many great bays, nearly unknown, lie between these points. Canairiktok, lying about three fourths of the distance to Hopedale, is a broad, winding bay twenty miles long. Canairiktok River, for seven miles above the bay, flows between high, level topped sand terraces, the remnant of a former flood plain, which ends in a triangular, flat-topped island in the mouth of the stream above the now growing delta. At the head of this seven mile stretch, which is an estuary, the river tumbles forty feet or more from the old level to the new. The region back of this bay is a rolling, rugged land with bare hilltops lying between one thousand and fifteen hundred feet above the sea. The old plateau surface can be made out fairly easily in the accordant summits of the hills. It is cut by numberless valleys with a dense growth of spruce and tamarack and hundreds of lakes and ponds.

The next bay to the north, Aglatok Bay, is similar to Canairiktok but somewhat narrower. The river at its head flows from out a long stillwater behind three precipitous mountains which raise their bare summits one thousand to eleven hundred feet above its banks, and seeks the level of the sea over a series of falls and rapids. The river deposits most of its load at tidewater and is shallow and sandy there. The banks are well clad with spruce and are composed of a pink granite.

Labradorite

Eighty five miles north of Adlatok lies Ford's Harbor on an island off the mouth of the Nain Run. The famous labradorite locality is on an island a little way up the run. It is here that the island barrier is thickest. The distance from Nain to the outermost island is nearly one hundred miles. These islands vary from a mile or two in diameter to a mere projecting rock and many sand dunes are found on some of those a few miles from the open.

Falls of the Canairiktok River, Labrador, from above, showing about Five Miles of the Estuary

The absence of sand and fine silt along the open coast is marked. The big rivers all empty into the heads of deep bays and naturally deposit their load far from the coastwise current, but whatever of fine material reaches the coast from these or the smaller streams which often fall directly into the sea, or is formed there by attrition resulting from the pounding of the surf, is carried off to be deposited somewhere further south.

A Rising Coast Line

Two things militate against the formation of any fine debris on this coast. First, the rivers generally flow through vast stillwaters consisting of lakes and sphagnum bogs before plunging over the edge of the plateau into the bays, and thus are singularly free from any mechanical load. The sand at the mouths of many may then be a reworked morrainic material and belong to a previous period of erosion. This is suggested by the composition of the river flood plains at Saglek Bay to be mentioned further along. Secondly, the coast is rising at a considerable rate, and this always exposes fresh rock to the action of the sea.

North of Ford's Harbor the height of the coast increases rapidly. The first marked elevation is reached at Port Manvers where Mt. Thoresby rises two thousand seven hundred and thirty three feet from the water level. It is composed of a dark rock, probably basalt or gabbro.

A little way north of here the Kiglapait Mountains (Esquimau for sierras) which, according to Daly, are a large mass of gabbro, parallel the westerly trend of the coast for a distance of thirty miles. A beautiful view of this rugged range can be obtained from the summit of Dawes Island. These ragged mountains have never been climbed nor, as far as we could ascertain, have their bases been explored. Their heights are not accurately known but they certainly rise between three thousand and four thousand five hundred feet, if not more. The lower slopes are rounded by ice but the summits are unglaciated needles of rock.

From this same point the first view of the Kaumajet Mountains was obtained. Their summits, covered with fresh snow, showed now over, now between, the clouds which drifted across the northern sky. It is a common thing in this country to have a clear sky and bright sunshine a few miles inland, while at the same time the islands off the coast, the towering capes, and the mouths of the many bays are wrapped in fog. Under these conditions the temperature varies many degrees between the fog-covered coast and the sunny land within. The east wind may drive the fog inland, but it is absorbed by the warmer air as fast as it advances.

The Hills Round Mugford Tickle

The Kaumajet Mountains, of which Cape Mugford is a part, rise as sheer cliffs and castellated towers between two thousand and four thousand feet high. They are composed of nearly level or slightly tilted sediments made up of normal land wash interbedded with tuff and breccia and underlain in part by a pillow lava flow, the whole resting upon the truncated surface of the contorted gneisses. Great talus slopes lie at the base of sheer precipices one thousand feet or more in height. Snow caps the higher summits most of the year and milky white streams tumble over the cliffs, leaving a shining trail of ice on either side.

Mugford Tickle is bounded by two high precipices. The northwest shore is the higher; and back of an eighteen hundred foot ridge which is hardly more than halfway to the summit, there lies an immense, barren cirque with thousand foot vertical walls. A few small lakes in this rock basin drain into the tickle over a three hundred foot cliff.

On leaving the tickle and sailing north the majestic summits of the Bishop's Mitre, three thousand five hundred feet high, and the four thousand foot dome of Brave Mountain come into view. The Bishop's Mitre has two peaked summits divided by a narrow chasm which cleaves the mountain most of the distance to its base. Two jagged rocks, rising nearly one thousand feet, stand at each side of the base of the cliff and help one to gauge its height. On the seaward side the thousand-foot tops of the many pointed Nascopie Island complete the view. This is one of the finest bits of scenery on the coast and, because of the form of the mountains, it stands in striking contrast to the smooth rounded and contorted outline of the shore or to the ice-like summits of the Kiglapait.

A Natural Tennis Court

One day's sail north of Mugford, past many high capes, lies the Esquimaux settlement of Hebron. The land here, about 1[illegible] high, vegetation consists only of mosses, berry bushes, grass, and the dwarf birch. The slopes and summits of the rolling mountains are covered by loose-lying cobbles four or five deep and frequent large-sized boulders. Here and there at the base of a cliff there is a pavement of rock slabs, which is nearly smooth enough for the surface of a tennis court. Coleman * has mentioned such pavements in the Nachoak region. He suggests that they owe their origin to the movement of deep snow under pressure; but their position here suggested their formation at the base of torrential waterfalls which existed possibly only during the melting of the snow in the spring of the year.

Twenty miles north of Hebron Cape Uivuk stands guarding the entrance to Saglek Bay. This is a one-thousand foot cliff composed of contorted grey gneiss cut by a number of perpendicular basalt dikes. An excellent photograph of this is to be found in Coleman's * report.

Saglek Bay

The outer part of Saglek Bay contains many islands arranged in two groups, and is surrounded by rugged mountains. It is impressive enough, but the true marvels are hidden behind the narrows.

When this point is reached, sixteen miles from the sea, an open, though rugged, arm makes away to the south,

North Shore of the Narrows of Saglek Bay, Labrador. Approximately 3500 feet high

and the main bay shrinks to a bare mile in width and winds inland at the foot of gigantic cliffs, which raise their turreted summits to between three and four thousand feet, almost vertically.

The narrows once past, the fjord splits into three parts. Two short arms pointing to the west and northwest are narrow chasms bounded by vertical walls well over half a mile high. A third runs for twenty miles to the southwest between nearly parallel, level-topped walls fifteen hundred feet high. It is less than a mile wide and ends in a three towered mountain, three thousand six hundred and fifty feet in elevation, which falls away on either flank to a flat gravelly river valley.

The sheerness of the walls, the vast, half revealed cirques, the hanging valleys, the tumbling, feathery cascades —each with its miniature canyon—the deep blue water, the bare brown walls, and the vivid sky above make a never to be forgotten scene of true magnificence. The cliffs all have talus slopes at their bases. These form a narrow strip of beach which slopes gradually for fifty feet beyond the water line and then plunges steeply into the depths of the fjord.

Even the bottoms of the valleys are nearly barren here, for they are beyond the northern limit of trees on the east coast. Grass and moss are common, and patches of willow five feet high grow in the protected hollows. Creeping

* Coleman, A. P. [illegible] Labrador and New Quebec. Canada Dept. of Mines, Memoir 129.

birch, alder, and berry bushes, reach up the ravines and make a thread of red and green in the uniform brown fabric of the moss. Even these cease as the altitude nears one thousand feet, and then the yellow brown mosses and grass alone bind the surface debris together.

The upper rocks are riven by frost, and tumble down to make great talus slopes of angular blocks.

The Inland Hills

The high, desolate plateau lies at an elevation of between three and four thousand feet. It is really the remnant of a former plateau and is an endless repetition of rocky summits and chasm-like valleys. These summits are either rough peaks of bare rock or rounded, nearly flat-topped domes covered by a debris of angular fragments of stone. Fields and patches of snow break the monotony of the scene and light and shadow alternate over mountain and valley, softening their harshness. When the sun is low this desolation is touched with a wild beauty by the pink and purple lights. At night the calm water is black under the shadow the cliffs, but in the center it reflects the brilliance of the stars and the pale tints of the aurora which waves through the sky like a filmy, wind-blown curtain.

The two rivers that empty into the bay come down through long, deep, U-shaped valleys and meander over gravel plains whose composition is too heterogeneous to be that of a river flood plain. Rather it is that of partially re-worked glacial material. The fine sand is being washed out into a composited delta, with very steep foreset beds. The emerging topset beds mingle with the old morrainic detritus.

The rock forming the mountain at the head of the bay is a garnet gneiss with irregular intrusions of a quartz-feldspar-garnet rock. Small garnets are an integral part of the gneiss, but many large ones, up to six inches in cross section, accompany the later intrusion. This appears to tally with the "grey or pale pink gneissoid rocks, mostly characterised by the presence of garnet" which Coleman* says "extend over a large part of the Komaktorvik and Nachvak regions."

The narrows are cut through a series of folded sediments. We did not have an opportunity to study these. They may or may not be similar to the sediments of the Ramah series on the south shore of Nachvak Bay.

The broken rock of the plateau is unlike the covering of rounded boulders so common over much of the lower land farther south. Those have been moved a considerable distance — often many miles — by the glacial ice that overran that land during the last great ice age. They are true erratics. The broken, angular debris, on the other hand, has been torn from the parent rock by frost and other agent of weathering. It is itself very deeply weathered and is either in place or has merely moved down hill under the influence of gravity.

Higher Levels Unglaciated

Judging from the evidence of this plateau, that of the upper reaches of the Kaumayet, and the unglaciated aspect of the Kiglapaits, it would seem as though all the high points of Northern Labrador must have projected through the glacial ice cap as islands of rock similar to the present day "Nunataks" of Greenland.

Some localities along the coast show poorly preserved chatter marks and glacial gouges. These do not show any regular trend for the ice and are most likely the result of the final action of local valley glaciers that remained after the disappearance of the continuous ice cap.

* Coleman, A. P. op. cit.

In measuring the height of the land about Saglek Bay and at other points along the coast a small aneroid altimeter was used. After establishing the height of any one point a Brunton Pocket Transit used as a level gave the approximate relative heights of other points within a few miles of the observer.

A Field for Exploration by the Initiate

This great coast, now almost unknown, will doubtless be the scene of fishing and hunting expeditions in greater number in the near future. Our party fared pretty well in this respect, but it must be remembered that there are years when game is plentiful, and others when it inexplicably disappears. These are times of death and hardship to the few roving Indian bands that compose the sparse population of the interior. These years cannot be foreseen and parties going inland should have a supply of food for every man for every day, as advised long ago by A. P. Low. In this manner the danger of a "lean" year will be avoided and the kind of disaster that overcame Hubbard's* ill-fated expedition need not be encountered.

Labrador is always grand and often beautiful. Its amazing coast and great silent interior call to the explorer, but the wilderness is quick to punish man for his mistakes; and here, as elsewhere, it must be approached with a full knowledge of the difficulties to be met, a knowledge which can best be gleaned from the records of the few who have gone before.

* The discoveries made by and the insuperable difficulties and hard luck encountered during this expedition have been admirably recounted by Dillon Wallace in "The Lure of the Labrador Wild."

WORLD PRODUCTION OF COAL IN FIRST HALF OF 1922

In spite of the great strike in the United States the world's production of coal in the first half of 1922 was greater than in the corresponding period of 1921. The total output in the six months January to June, 1922, according to reports collected by the United States Geological Survey, was approximately 568,600,000 metric tons.

Continued for twelve months, this rate of output would yield a total of 1,137,000,000 tons. Settlement of the strike in this country insures that world output in the second half of the year will be greater than the first, but even so, it seems unlikely that the total for 1922 will much exceed 1,180,000,000 tons. This is an increase over 1921, but a decrease of nearly 140,000,000 tons from 1920.

No other fact indicates more clearly the world-wide industrial depression of the past year and a half. In comparison with the last year before the European War, the present year shows a decrease of 12 per cent. and this in spite of the fact that in pre-war years the world consumption of coal was increasing at the rate of 38,000,000 tons a year.

Comparison of the figures for the first half of 1922 with those for the corresponding period of 1921, shows an increase for most of the countries of Europe. The increase was greatest, of course, in the British Isles where the mines were closed by a strike, in April, May, and June of last year.

The Canadian Ingersoll-Rand Company have lately issued Bulletin K-701, *"Circo" Steam or Air Hoists*; and Bulletin K-702, *"Circo" Electric Hoists,* describing in some detail all these classes of hoists, almost all of them applicable to mining work. The Bulletin will be sent, on application, to those interested.

A Budget From New York

by KIRBY THOMAS

Copper and the Electrical Industries

Copper, in addition to being one of the best conductors of electrical current of all the base metals, has also qualities of ductility and strength which make its general use in the great field of present day electrical applications a practical necessity. Statistics show that for the decade prior to 1914 more than half of the world's yearly output of copper was consumed in the electrical industries. During the war the special military requirements for copper and the abnormally high prices for it that prevailed together with the practical suspension of any new large electrical installations for industrial or commercial purposes had the effect of greatly curtailing the large electrical market for copper. But now conditions have changed. The market price for copper has declined to below the average for the pre-War decade and there are great surplus stocks of copper available for all industrial uses. However the demand for copper in the electrical industries is as yet comparatively small, for there is seen no large extension of power or transportation facilities owing to the continued bad conditions of business and industry generally, and existing electrical industries have been at a low ebb of operation. That this condition is slowly but certainly changing must be recognized. The return of normal, or good, business conditions in this country, and the betterment of business abroad will have the effect of increasing greatly the demand for copper in the electrical industries. Already many hydro-electric and large steam electric power installations are planned, and their need is today going right over before. Their realization only awaits reasonable or better conditions for their financing. Such conditions must come sooner or later.

The economic and methods of generating and of long distance transmission of electrical energy also have been greatly improved recently. The number and extent of these are generally unrealized by those not connected with the electrical developments. A western electrical engineer has estimated that in the next decade there will be established in the western states electric plants with a total capacity of 2,500,000 horse power, and that these will require about 250,000,000 pounds of copper. The power plans for the North Atlantic states exceed this considerably. A government engineering commission reports a total electrical installation of 17,500,000 horse power. A California power company has recently completed 10,000,000 pounds of copper for conductors now being built. Large electrical installations already in the Southwest in connection with their electric power projects. Several of the large eastern railroads have definite plans for the electrification of portions of their lines where traffic density and terminal operations permit. In Europe and in South America railroad development programs are depressed now, and awaiting the upturn in the world's business.

Plans are rapidly progressing for the restoration of the world's normal demand for copper, and on a scale greater than ever before. The assurance that copper mining is not going to be permanently restricted and they portend a demand that will tax the productive resources of the country's large copper mines, most of which are today idle or operating on a greatly reduced scale. The prospect of a return of normalcy in the copper industry is a matter of great concern, not only to a large number of investors in copper mining stocks, many of which stocks have heretofore been consistent dividend payers, but to the many once-thriving communities in the west, and in the Lake Superior region, dependent on mining activity, and also in the far reaching collateral business connected with the production and industrial applications of copper.

"Makings" for Cigar Lighters

The matchless cigar lighter seems a simple thing enough with its rough-edged metallic circle emitting the shower of sparks that kindle the oil-saturated wick, or tinder; but when the scientists do the talking, it is quite wonderful after all. The sparking wheel is made of a pyrophoric alloy, according to these same scientists, and the principal ingredient is a rare element called cerium. This material, mixed with about 20% of iron, has the peculiar quality of oxidizing, or burning, when struck or scratched. This property is not confined to cerium and its alloys; the old fashioned use of flint and steel was based on the same phenomenon, and the sparks from the steel of the shoe of the running horse is another example. But the cerium alloy is more effective and certain than the flint and steel, and hence its wide use for the now common cigar lighters, and for the automatic lighters for the miners' acetylene lamps.

Cerium is found in Brazil, and also in the Carolinas, where it is associated with another rare and useful element, thorium, from which is made the incandescent gas mantle. Cerium has been obtained chiefly as a by-product from the thorium treatment operations. For a long time the demand for it was limited, and large stocks were accumulated. These, however, were all used during the war, to supply the armies with lighters, and the increasing requirements of the material for its pyrophoric qualities have made it necessary to search for new sources of supply.

Back in 1893, a geologist engaged in scientific work for the Canadian government, made a record in his voluminous notes of the occurrence in a remote locality of northern Quebec of a granite ledge, in which were interspersed plentifully crystals of a rare mineral called allanite, a mineral that contains the element cerium and also didymium, lanthanum, and other rare elements and some thorium, a radio active element. Recently the Canadian Geological Survey has made an investigation, based on the casual record of this observing geologist. The ledge was found far north in Quebec, about fifty miles from Grand Mère in the division of Three Rivers, and there was disclosed what appears to be an extensive deposit of this now valuable mineral. Crystals of allanite, 6 inches by 4 inches by 2 inches, spotted the granite ledge over a large area, and clusters and groups of smaller crystals were found abundantly. It is estimated that the rock may yield better than 1 of allanite and that the extent of the deposits is practically unlimited. Thus the purely scientific observations of the geologist, made without thought or knowledge of any possible commercial application, have become after many years the means of discovery of a valuable natural resource.

The Mine Explosion on Vancouver Island

FINDING OF THE COMMISSIONER

The cause of the explosion of August 30th last in No. 4 Coal Mine, Cumberland, Canadian Collieries (D) Ltd., in which eighteen lives were lost, a detailed description of underground conditions before and after its occurrence, and several recommendations are feautres of the report of Mr. George Wilkinson, former Chief Inspector of Mines for British Columbia, who was given a special commission by the Hon. Wm. Sloan, Minister of Mines, to investigate and submit a report upon the disaster. Of those fatally injured on this occasion it will be recalled that two were British subjects, one Russian, six Japanese and nine Chinese.

In a few words, Mr. Wilkinson finds that the source of the trouble was a flash or open sparking caused by an arc in the electric trailing cable at the connecting socket used in connecting this cable with the main electric circuit. This electrical system was used to furnish the power necessary for the operation of a coal cutting machine. The latter was of a type approved by the United States Bureau of Mines for use in gaseous mines.

Regulations Recommended

"After giving the matter very careful consideration" says Mr. Wilkinson "I would recommend the adoption of the following rules as part of the Coal Mines Regulation Act, and would further suggest that the whole question of the use of electricity be fully investigated by the Department of Mines and, if possible, definite conclusions reached with reference to the permitted use of this power underground in coal mines."

Following are the recommended rules:

(1) No terminals of main feed lines shall be located nearer any coal face than 50 feet.

(2) When blasting is being done the current shall be cut off and the cables made dead in that vicinity, and the current shall not be switched on again until blasting is finished and the places are examined and pronounced safe and the cables have been examined and found free from any damage which may cause defects.

(3) All permanent electrical installations and transforming stations underground shall be made fireproof.

(4) All switches and terminal connections shall be protected or enclosed so as to prevent accidental contact by persons, and danger from arcs or short circuits, fire or water, and where there may be risk of igniting gas, coal dust, or other inflammable material, all parts shall be so protected as to prevent open sparking.

(5) All cables used underground shall be covered with insulating material, and where high pressure voltage is in use, properly armoured cables of standard thickness shall be used.

(6) All trailing cables shall be of properly armoured construction whatever voltage is used.

Confidence is expressed that these rules will give additional margin of safety. Rules 1, 2, and 3, it is asserted, should be put in force at once. As for Rules 4, 5 and 6, it probably will require three months to secure and instal the armoured cables and other material required to make them effective.

Mr. Sloan already has taken the action necessary to give these recommendations the effect of law. Orders-in-council have been passed and from October 2nd the rules enumerated are a part of the "Coal Mines Regulation Act." operators of Collieries in the Province have been so notified and Inspectors of Mines have been given instructions accordingly.

Carelessness with Electric Cables

The electric cable to the coal-cutting mahine was damaged by flying rock from a brushing shot, and the resulting arc ignited a small pocket of gas.

In the course of "general remarks" the Report reads: "The unfortunate loss of life in this case is to be regretted. It was a small explosion to take such a heavy total and it was a combination of circumstances which made it do so. Occurring on a longwall face it naturally brought a number of men in the path of the flame in a short distance. Owing to the most of these men being engaged working in the face, and the seam not being very high there was no way of escaping. It is the opinion of the writer that if the current had been cut off the cable while the shot was being fired there would have been no explosion and it was an error of judgment on the part of the fireboss in not having this done when the terminals of the feed cables were in such close proximity to the shot. It would have been better if the terminals of the main feed line had not been located so close to the face and fixed flameproof terminal boxes had been used. This does not suggest that it would not have been possible for an arc to be created if the above named terminal boxes had been used because if the blow had been of sufficient force to draw the bare end of the connecting cable clear of the insulated material it may still have created an arc but the chances of doing so would have been less. It is questionable owing to the amount of gas being given off and the peculiar conditions existing if it would be wise to continue the use of electric mining machines in this section. At present there are no specific regulations governing the use of electric power in mines of British Columbia, this power having been used only to a limited extent. No doubt the use of this power will be increased in the future when electrical development takes place in the Province. Electric power is used extensively in the United States and great Britain in and about Coal Mines.

Appliances all of Approved Types

"These electric coal cutting machines were installed by the Canadian Collieries (Dunsmuir) Ltd., nearly seven years ago, and the recent accident is the first recorded. While approved by the United States Bureau of Mines, the standard of safety must be judged by the weakest link. The weakest link in my opinion is in cables and connection in close proximity to the working face."

Mr. Wilkinson states it is deplorable that this accident should occur after the efforts of the Mines Department and the management to safeguard operations. He continues: "Edison electric safety lamps are used throughout with the exception of the few flame safety lamps for testing purposes. No blasting down of coal was permitted in this section, and most of the brushing was done without blasting, it being only resorted to in places where the rock was so hard it could not be lifted without it. Only permitted explosives were used.

It is hard for the higher officials and the Inspectors to watch every detail in a mine of this size. The ter-

minals of the main lines are being moved from time to time, and this detail comes more under the control of the under officials. There were plenty of electricians employed to carry out the work, and also a sufficient number of certificated officials employed to supervise all work. In addition to the large staff of regular officials, there is employed a safety Engineer who holds a First Class Certificate of Competency. He constantly patrols the works inside and out, checking up and pointing out any defect he may notice that may cause accidents."

Mr. Wilkinson is of the opinion that the point of ignition was a cavity in the roof near the face of No. 1 slant. "This" he states, "yielded sufficient flame by being fed with gas from the crevices to reach No. 3 counter roadway where explosive gas was known to exist. This explosive gas was connected up with the various crevices and cavities in the roof. Once ignition took place a suction would be created which would draw the methane from the crevices, feeding the flame until this point was passed after which it would die out."

Arc Ignites Gas in Cavity

Commenting further on the cause of ignition it is stated that the main three phase circuit was carried up No. 1 slant, No. 4 level to a point approximately 16 feet from the coal face and about 4 feet from the end of the brushing. The top cable was about 17 feet below the roof line and the bottom of the cavity and the lower cable was about three feet above the top of the brushing. He speaks again of the breaking of the wire by flying rock following the firing of a shot and asserts that there must have been considerable flash from the arc so created. The break occured only about 2 ft. from the cavity. There were only two possible sources of ignition, one the arcing of the electric circuit and the other flame from the explosive in the shot. The shot was a good one, he says, and the chances that any flame resulted are very remote. It was some 8 ft. from the cavity while the junction point of the trailing cable was only about 2 feet distant. He adds "*from conditions as seen after the explosion I have to conclude that actual ignition must have been from flame or sparking from the electric circuit.*" Reference is made to the evidence of the fireboss at the inquest to the effect that he had carefully examined the place before firing the shot and found no gas and also that he had examined the cavity in the roof with similar results. Mr. Wilkinson expresses doubt of this. It is possible, he says, that this was done and that there was a change between the time of examination and the firing of the shot. However assuming the cavity was clear, so far as could be ascertained from the fireboss' lamp, there is no doubt gas above this line in the cavity.

Imply Ventilation

Dealing with the ventilation it is stated that on the 26th day of June there was 22,000 cubic feet permitted for [illegible] men and 8 mules, on the 25th day of July 20,000 cubic feet permitted, and the 11th day of August 24,000 cubic feet for the same number of men and mules. The present passing is nearly three times that required by the "Coal Mines Regulation Act" under normal conditions, according to Inspector Jackson. Since the installation of a booster fan, electrically driven for augmenting the ventilation the quantity passing in this district has been increased some 6,000 cubic feet per minute.

Officials of the Canadian Collieries are said to have been faced with unusual difficulties in the ventilation of the mine, which is of large extent, having been operated for 30 years or more. Large extraction of pillar areas in the earlier days of operation, without any thought for the future, has resulted in a problem for solution by the present day management. Mr. Thomas Graham, the Superintendent, and his staff have made many improvements in the past five years. Among these are: "the building of permanent stoppings with a gunite finish in cement practically throughout the mine on main airways. The installation of a second fan of the Sirocco double inlet reversible type with a rated capacity of 200,000 cubic feet per minute against a 6" water gauge. The construction of a new separate return airway through the old works practically the whole length of the slope."

NEW CALEDONIA NICKEL

(Translated from "LE BULLETIN DU COMMERCE", Nouméa July 28th., 1922.)

Société le Nickel

A meeting of the shareholders of this company (the largest miner and smelter of nickel ore outside of Canada) was held on the 8th May, 1922. Mr. Tambour, president of the Board of Directors, presided, assisted by Messrs. Puerari (of the firm of Miraband and Co.) and Albert Ducros, scrutineers. At the opening of the meeting holders of 24,594 shares of stock, or their proxies, were represented.

During the past fiscal year, which ended the 30th June, 1921, the company has suffered from the effect of an economic crisis. Although during the first months the tonnage of sales shows a slight increase over that of the preceding months, at the beginning of January it dropped 50 per cent. and continued to decrease during the following months, owing to the dullness of the metal markets.

In order to curtail expenses certain steps have been taken by the Directors which have already produced good results, notably the concentration of the management at Thio and the removal there of different departments which had been up to that time located at Nouméa. The smelter has operated continously, but under most unfavourable conditions owing to the high cost of fuel and the rate of exchange in Australia.

In Europe, the furnaces in England have remained completely closed down. The refinery at Havre has been working uninterruptedly, sometimes at full capacity, sometimes with a reduced output. The mill at Iseriohn, after being remodelled, has resumed operations.

One of the greatest difficulties met with in connection with the work of the company has been the recruiting of labour. As a sufficient number of native workmen could not be obtained it was necessary to import men from Indo-China. The latter are well adapted to New Caledonia conditions and it would seem as if this venture should help to solve the problem of labour in our Pacific colonies.

The "Société le Chrome", grantee of waterpowers in New Caledonia, have intrusted their development to the "Société le Nickel". It is estimated that in two years the electric refining of nickel ore in New Caledonia will commence.

The meeting passed unanimously the financial statement for the fiscal year just closed, the statement showed a credit-balance of 1,105,112 francs.

News and Comments

By ALEXANDER GRAY

Plea for Mining

As a rhetorician, Ex-Governor F. T. Congden of the Yukon, who is logical withal, told some wholesome truths to the Reform Club of Montreal, about the indifference displayed toward Canadian Mineral Industries, Mining Laws and the Geological Survey. Of course eloquence has its indiscretions. Over-statement, though, is a pardonable element in propaganda. Mr. Congden, at any rate, stirred up those present on the occasion; it may be his remarks will arouse the Government of Quebec to a fuller realization of the importance of the Department of Mines and the necessity for a more aggressive policy.

It is inadmissable that "anyone who knows something about minerals is of the opinion that there is more gold in Quebec than in Ontario"; Mr. Congden was a trifle too flamboyant in that respect. Yet if the Quebec Department of Mines is allowed to prove it everyone that is "anyone" will applaud.

Advocating the cause of the Geological Survey, bespeaking for its members a more dignified and remunerative status, Mr. Congden urged scientific prospecting and simpler language in reports. To him Dawson's documents were admirably "simple and intelligent". However, elementary Mr. Congden would have the Geological papers, he could not accomplish his purpose by putting the Survey upon a kidergarden basis. Universality of mining laws might not be amiss, but Mr. Congden as a student of law understands that the average legal document is no less technical, and he could degrade a lot of professions by presuming upon the ignorance of the populace. "Cruelty to animals," as he expressed it, might then have a broader application. It is more to the point to have the Geological Survey and all Provincial Departments of Mines adequately organized, supported in a manner conforming to the ambitions of the country, and to have it officially admitted that Mineral Industries are pre-requisite to greater prosperity.

Dealing with the Immigration impasse, Mr. Congden was in happier vein. Under prevailing embargoes, "Lao Tze or Confucius could not come to Canada; Socrates would have been barred as a vagrant, and St. Paul would have talked too much for the liking of our authorities. Besides, he was hunch-backed. Judas Iscariot, on the other hand, would have been welcomed for his 30 pieces of silver."

While exaggeration is permissible in the circumstances, ridicule is more effective and Mr. Congden availed of it to bring about modifications in the regulations. Systematic prospecting, the sectioning of Quebec to that end, strengthening and simplification of the work of the Geological Survey, are laudable objectives. What is the prospector going to get if essential skilled and unskilled labor is not obtainable for even producing properties? Recruiting of labor has precedence at this writing.

Death of Major General Sir John Carson

The death of Major General Sir John Carson,—Ex-President of the Crown Reserve Company, prominently identified of late with the Asbestos Industry, a life-long soldier, civic and on active service—was expected. A stroke had made it inevitable. What he did speaks for itself. His Peace and War work gave him a place on the Roll of Honor — and what better could he leave as a heritage! Moreover, he gave a son to the Allied cause, and sacrificed most of his own fortune to it. Decorated by the Empire, as well as by what was an Empire—Russia—he died among his friends and left a record of deeds that are still influencing North Country developments.

The Dome Quickstep

To quote a Dome official: "We can't find anything but high grade." Both walls are asserting the merits of contact country, and the pace can be maintained, for some time at any rate. Enough is assured to sustain handsome dividends and redeem capital on the double-quick, and that is a very different story from what was told in the earlier operating years. While the going is so good, the Dome Treasury will be all the stronger, and it is to be emphasized that there is a substantial tonnage of ore broken in the stopes—more than ever there was. In the nine months to October, production amounted to $3,086,275—practically double what it was in 1921. At that rate the 1922 production will total about $4,400,000 gross or cent per cent on issued capital. With $13,000,000 from Hollinger, $4,400,000 from Dome and McIntyre gaining, the Porcupine trio of producers may come near to the $20,000,00 mark, thus exceeding any State in the United States.

Partial Coal Solution

Headed by Deputy Minister of Mines Camsell, a Commisson of Departmental Scientists at Ottawa is reported by the Canadian Press Association to be about to seek a solution of Canada's Coal Problem. The central idea is to promote the use of domestic fuel. Not a bad idea by the way, if we go about it in the right way. It almost seemed as though Canadian Coal was becoming anathema — unless the railways made it possible to bring along better grade western fuels. The latest Commission is to see whether the Maritime Provinces product cannot be given larger domestic markets by means of by-product coke ovens. Again the daily press seems to have forgotten that there are already extensive by-product ovens, installed at considerable expense. Had those ovens been availed of, or were they located at a more central point, coke could be had and the market for by-products during the recent coal strike in the States would have been very profitable.

Professional "High-Graders"

Rascality on a large scale — not mere contumacy — has been back of the extensive "high-grading" for which several thieves are under arrest. Probably those who are in the toils are the mere dupes of those who procured the ill-gotten gold. It does not matter so much who were the principals and who were the crooked "simps", so long as there is a complete exposé, and adequate punishment is meted out to the organized gang. By making an example now of the culprits, the danger of recurrences of the thievery may be obviated. The men behind the thieves should have the limit of the Law. That is the only effective way in which what is an evil in every gold field can be restricted. Whoever are the "higher-ups", they should be brought to book. Elsewhere punishment has been imposed that has met the situation, so why not in Northern Ontario?

Lawson's Emblematic Elephants

"To satisfy creditors," a dozen ivory elephants cherished by Tom Lawson had to go under the hammer. The ex plunger patterned most of his "biggest stock coups on scales suggested by the contemplation of the beast's size", it is explained. The collection brought $57.50, elephants being a buyer's market. Now Lawson will be without inspiration. He has one consolation, however, his pachyderms were negotiable, even as a Job Lot. Therefore, they differ from collections of share certificates and prospectuses, which merely offend olefactory nerves. Lawson's following ought to have purchased the elephants and donated them to a Curb Exchange, where braying bipeds frequent the arenas. "The beast's size" appealed to Lawson — why not others.

Washington's Gold Hoard

On October 1, the Federal Reserve Banking System held $3,060,501,181, of the $3,874,178,711 in gold in the United States. In other words, the Federal Reserve is 79 per cent of the American gold holding, and the grand total in the States is nearly half the world's "visible supply." The Nest Egg is large enough, but needs fertilizing.

Pinnacle Lake Prospects

Crown Reserve officials are favorably impressed with the results obtained in the shaft and from what little additional work has been done. The shaft is down 300 feet. In it narrow new veins, distinct from what was outcropping and drilled, have been noted. Values are alleged to be attractive, insofar as they go. Structural features in due course will be elucidated, and if widths and values are maintained it may be the Crown Reserve's history will commence another chapter. The larger section tapped by three holes was not very enthusing. It is the presence of the smaller things, and the values, that make the locality interesting. Even the Associated Gold Fields of Larder Lake is alleged to have milling grade calling for further demonstration. It will require a few million tons to measure up to their be millioned capital.

Asbestos Corporation Expansion

It bespeaks confidence in the outlook to have the Asbestos Corporation of Canada announce its intention to expend approximately $500,000 upon milling additions that, needless to say, will be modern and efficient, costs and economies being a factor of increasing moment. The intimation is that contracts will be let and construction started as soon as the Quebec Government decide as to the mooted export tax. No new financing is contemplated, for the corporation has cash resources of over $2,500,000.

News of Mining

Great Britain

Speaking at the annual meeting of the Ebbow Vale Steel, Iron & Coal Company, Limited, Sir Frederick Mills, Bt., stated that the Company had been treated very shabbily by the Minister of Munitions. During the war the Ministry ordered the company to erect 20 blast furnaces in certain parts of Great Britain and made no promise for their completion until after peace had been declared. Sir Frederick declared that five furnaces completed would have served the Ministry. The company now has the furnaces on its hands and must suffer the cost of a bad bargain.

United States

According to press correspondence, Henry Ford's activities in coal mining plants as a protest against coal profiteering will not stand close examination. Mr. Ford after he had expressed the opinion that prices set by the Government were fair, was offered the entire output of coal mines now by Michael T. Roach, President of the Detroit Consolidated Fuel Company, at government prices. The offer was evaded by Mr. Ford, who preferred to wait for the days of closing down. In an interchange of correspondence it transpired that Mr. Ford claimed that [illegible] he would get coal f.o.b. mine at $2 per ton. This statement was strongly questioned by coal operators.

In [illegible] the monthly average of coal used in the manufacture of coke in beehive ovens has fallen from 1,351,000 tons to about 800,000 tons.

At the [illegible] the grand jury in the Herrin (Southern Illinois) massacre case has indicted 59 persons on the charge of murder and conspiracy. The United Mine Workers are making violent efforts to block the progress of the investigations. Evidence is now being given freely and in ghastly detail. One taxicab driver is charged with cutting the throats of the wounded. The union is levying contributions for the defence of the accused.

A striking instance of industrial conservation is afforded by the action of the Anaconda Copper Mining Company in purchasing recently a Florida phosphate rock deposit. The recovery of the company's waste sulphur gases will enable it now to enter the field as a producer of fertilizers. The price paid for the phosphate property is said to have been $1,000,000.

In a summary of development of the shale oil industry in the United States, published in the Journal of Industrial and Engineering Chemistry, Professor Ralph N. McKee stated that the known deposits of oil shale in the States and in the Maritime Provinces must be developed and utilized as they are the only source of petroleum after exhaustion of the probable supply from wells. He estimates that to meet the increasing demand for petroleum, even making no allowance for the expected decrease in the production from oil wells, will require the construction each year of 75 shale oil plants each with a capacity of 2,000 tons of shale per day and each entailing the investment of nearly one million dollars.

The price of lead has been advanced from 6 cents per pound to 6.10 cents per pound by the American Smelting and Refining Company.

The pre-natal effect of high tariff legislation is seen in the heavy decrease in the importation of metal in the United States. Gold imports during August amounted to $19,000,000, as compared with $8,000,000 in August 1921, and with $13,000,000 during July of this year. Gold exports reached the figure of $5,000,000. Imports of silver for August aggregated [illegible] exports totalled $1,000,000.

The National Lead Company, which [illegible] Simon Patino, the Bolivian tin mine owner, and English investors, owns the Williams Harvey Company, Limited, of England, and the Williams Harvey Corporation of New York, has acquired a large [illegible] in the

Compania Estanferam, Chile, the largest producer of tin in the world. The purchase was facilitated by the decline of the Chilian peso to under ten cents and the consequent fall of the Compania Estaniferam shares on the Valparaiso Exchange. The Williams Harvey-National Lead people have thus been able to secure long-term contracts for about three-quarters of all the tin ores produced in South America. The Williams Harvey smelters in England are the largest now in operation. It is stated that the consideration paid was $1,500,000.

Word has been received in New York that the British Controlled Oilfields has struck oil on its Buchivacoa concession in Venezuela. It is stated that the oil was encountered at a depth of 630 feet. The Standard Oil Company, through one of its subsideries, arranged recently to take over the development of half of the British company's holdings. The Imperial Oil Company Limited, of Canada, is the subsidiary in question.

The pipe line of the Illinois Pipe Line Company is being extended into Montana oil fields and large storage tanks are being erected to provide for handling the increased flow in the Kevin-Sunburst area, Toole County. Arrangements have been concluded whereby most of the production will be taken by the Imperial Oil Company of Canada.

Europe

Figures made public by the German Federal Department of statistics show that the wages of coal and lignite miners have gone up somewhere between 2,000 and 3,000 per cent since 1913. Surface workers are now paid an average of 109.19 marks per shift, an increase of 2,777 per cent over 1913; hewers and trammers get 131.54 marks, increase, 2,185 per cent; other underground workers average 106.86 marks, an increase of 2,538 per cent.

Confirmation has been received of the report that the Standard Oil Company has obtained concessions from the Government of Czecho-Slovakia, permitting it to exploit the unexplored oil territories of that country. The Standard's subsidairy in Czecho-Slovakia is the Franco-American Standard Oil Company.

Government attempts to nationalize the Rumanian petroleum industry are blamed for the present decline in production. Present outputs it is stated, amount to only one-third of the pre-war production, and the greater part is absorbed by the Government. Railways are in bad condition and much oil is going to waste because of the shortage of tank cars.

For the first five months of the year the production of crude oil in Poland was 281,321 tons the largest output for any one month being recorded in May when it reached 61,296 tons. The bringing in in July of the Ratoczyn No. 1 well at Boryslaw, with a daily flow of 150 tons, was the outstanding event of the summer's development.

The French Minister of Public Works, according to the Paris publication "Information", will in the future require holders of new minging concessions to form a Syndicate for the regulation and promotion of the sale of ores, etc. It is suggested by the writer of the article that groups or sub-syndicates be formed for each class of ores. Another suggestion is that trading companies now engaged in importing and exporting be entrusted with the marketing of the various ores, thus minimizing the evil effects of competition between individual producers.

Australia

A gold mine that is noteworthy for its longevity is the No. 4 North Phoenix, Gympie, Queensland. It has been working for 41 years. Since the year 1882 Mr. James Brown, the present manager, has been in charge. This summer a lot of 120 tons of ore yielded 3,358 ounces of gold.

At the Central mine, Broken Hill, New South Wales, the main vein recently showed a 12-foot face of galena averaging 68 per cent lead and 20 ounces of silver to the ton.

A bucket dredge is being erected in the Macquarie River near Wellington, New South Wales, with a capacity of 600 tons per hour. Each bucket has a capacity of 13½ cubic feet. The average gravel value is 1s. 4d. per cubic yard.

At the Central mine, Broken Hill, New South Wales the addition of 500 tons weekly from an 18-year old slimes dump is made to the ore being milled. The recovery is satisfactory and the results suffice to keep the mine on a paying basis. The dump contains about 1,500,000 tons. At the South mine, in the same locality, an old dump of about 200,000 tons is being re-treated at the rate of 2,500 tons per week. Here, also, the company depends upon the addition for its net profits.

In the Kalgoorlie district of West Australia, the Crow's Nest gold mine, near Yalgoo, milled 1,200 tons of ore during July for a yield of 900 ounces.

Africa

A British consular report from Lourenco Marques, Portuguese East Africa, states that there has recently been much prospecting carried on in that country. From the Zambesi region the discovery of oil is reported. Tin also, according to information received, has been found. A coal seam near Tete is at present being examined.

F. S. Pearson Engineering Corporation, Fisk Bld., Broadway and 57th. Street, New York City, have re-established their Department for Industrial Management and Technical Auditing of Industries and Public Utilities. This Department will be carried on, together with their usual work of financing, developing, design and construction of Engineering Projects and Industrial Plants.

The Canadian Link Belt Company Limited, Toronto, have just issued a new 832 page general catalogue which, they advise, is the most complete and costly they have ever issued. This catalogue includes their new line of Helicoid Screw Conveyors, Machine Moulded Gears, etc., and will undoubtedly prove of great value to those interested in elevating, conveying, power transmission and labour saving machinery in all its modern forms. The catalogue includes a complete line of the H. W. Caldwell and Sons Company's Plant of the Link-Belt Company. It is available on application to their Toronto Office, Wellington and Peter Streets or Montreal Office, 10 Gauvin Lane, to anyone who will state his connection with the mining industry.

By the Treaty of Versailles, the island of Spitzbergen was given to Norway, its ancient owner. Since that time Norwegians have been active in developing the coal deposits of the island. It appears now that the quality of the coal is not so high as was expected, and the Norwegian investors are in serious finacial difficulties.

The Mining Districts

BY THE JOURNAL'S CORRESPONDENTS

ONTARIO

NORTHERN ONTARIO

(Special Correspondence)

Origin of The Fire

It now appears that the fire that devasted such a large area in Northern Ontario was not a regular forest fire, in the ordinary sense. The country that was burned over was, for the most part, clear of forest and comparatively well settled, and the fire swepth through small second-growth green bush and settlers' clearings. A large number of small fires wert joined into three or four larges ones by the sudden and heavy wind that sprang up.

Dr. C. D. Howe, dean of the Faculty of Forestry of the University of Toronto, states that forest fire prevention is a question of public morals, and that there will never be adequate fire protection in Northern Ontario or anywhere else until the people demand it. A complete survey will be made of the burned area by the Government and steps will, no doubt, be taken to avoid a recurrence. It is, unfortunately, the habit of the Government to withdraw the Forest Rangers on the 15th of September, irrespective of conditions. There is no question that, in view of the extremely dry season, the rangers should not have been withdrawn and further, that no settlers should have been allowed to burn slash under the conditions that prevailed and in any case only under the supervision of the Rangers. If more stringent measures are taken regarding the burning of slash, our losses from bush and forest fires will be greatly lessened.

Relief Measures

Latest reports show that over 40 people are dead as the result of the fire, while it is estimated that over 8000 people are homeless and that property damage will run in the neighborhood of $8 000 000. Effective relief measures are, however being taken, and at present time everybody is under shelter of some sort or other, and is being supplied with food, blankets, mattresses and stoves. In some of the farming districts the losses are particularly severe, and in one township, 64 settlers are homeless out of a total of approximately 78. Under these circumstances relief will have to be given for a long time, and in many cases fodder also will have to be provided for the stock. There are not enough houses in the district to take care of the population, so the relief committee is purchasing lumber in large quantities with the intention of providing the lumber for shacks 16 feet by 20 feet for those who will build and occupy them.

Within a few days after the fire Haileybury and New Liskeard were provided with light and power. The Northern Ontario Light and Power Company are making strenuous efforts to repair the damage done to their transmission lines and sufficient power was obtained at Charlton to provide for pumping the Kirkland Lake mines and lighting for the town. It will, however, be a week or more before the damage is repaired sufficiently to enable the Kirkland mines to resume operations. The two mines in South Lorrain are again working, power having been provided for them on the 7th. During the last few days there has been enough rainfall to provide sufficient water in the Montreal River to generate sufficient power to carry the load in Cobalt. Companies were notified on the 13th, that there was sufficient power for their requirements and operations again commenced.

Keeley Output

Recent developments at the Keeley continue to be favorable and the September output amounted to 83,000 ounces, which is the highest in the history of the company. It is anticipated that the company will be able to maintain an output of approximately 80,000 ounces per month.

Mining Recorder now in Cobalt

The Mining Recorder's office has been established in the Town Hall of Cobalt. Some fear is felt regarding the safety of the Mining Recorder's records for the Temiskaming Division, as it is understood that some damage was done to the vault, which fell through to the basement. It is also estimated that approximately fifty mining companies in this Division lost all or part their records, which were in various offices throughout the destroyed portion of the town of Haileybury.

Shipments from Cobalt continue to be large and the shipments from this camp for the month of September were the largest this year, the total being 1,593,000 pounds. Most of this, however, consisted of residues, of which the Nipissing shipped 10 cars, containing 719,000 pounds. Of these, two cars were consigned to a pottery firm in Berlin, Germany. The Mining Corporation also shipped seven cars, containing 588,000 pounds of residues. The O'Brien shipped two cars of ore, and the Coniagas and Dominion Reduction each shipped a car of concentrate.

Castle

Favorable reports continue to come from the Castle property in Gowganda, and it is understood that the annual report, which will be issued shortly, will show ore reserves in the neighborhood of 600,000 ounces.

Lorrain Consolidated

A deal is apparently being negotiated for the Lorrain Consolidated, as a large block of stock recently changed hands. The property adjoins the Keeley and the Frontier, and in view of the favorable results being obtained on both these properties, either the Keeley or the Mining Corporation is the likely purchaser.

A Deal in Dumps

The Dominion Reduction has entered into an arrangement with the Crown Reserve for the treatment of the latter company's surface dumps.

Lake Shore Shaft

The annual report of the Kerr Lake for the year ending August 31st last, shows total receipts of $1 501 181, and net profits of $413,870, a decrease of $65,000 compared with the previous year. Dividends amounting to $300,000 were paid, the and Profit and Loss surplus is shown as $1,228,000. The revenue of the company has come from the operations of the Vipond

BRITISH COLUMBIA

Dr Hanson Returns From Portland Canal

Dr. George Hanson, of the Canadian Geological Survey has returned after spending the summer in geological research in the north of British Columbia. He says that the camp at the Premier Mine, Salmon River, has been built up to such an extent in two years that one scarcely recognized it. He spent a considerable part of his time in the country adjacent to the town of Terrace on the Grand Trunk Pacific Railway. In this district four prospectors were developing a high-grade property and hoped to be able to ship a carload of ore to the smelter, after transporting it 40 miles by wagon road.

Large Nugget From Cariboo

D. J. Ashley, of the Cedar Creek Mining Co., is exhibiting in Vancouver one of the largest nuggets that has yet come out of the Cariboo. It is about 1½ inch in length and weighs 3 ounces.

Kleenza Creek Area Promising

The Peerless, Montana and Wells groups of mineral claims, situated at the head of Kleenza Creek, Northern B. C., are looking very well on development. The veins have been proved at depth and there appears to be a considerable amount of high-grade ore as well as a large body of lower grade. The principal values are in copper.

Granby Achievements and Plans

It has been announced that all the 2500 employees of the Granby Consolidated Mining & Smelting Co. received an increase in wages on October 1st, amounting to about 50 cents per day. This Company, it is stated, expects to produce 30,000,000 lbs of copper this year. During the first part of the year the production amounted to some 13,000,000 lbs, but since the end of June operations have been speeded up. Plans have been completed for a concentrator, but the time has not yet arrived for its installation. Eventually, however, Granby will become a milling proposition. The hydro electric installation is being hurried to completion and it is hoped that it will be ready by the end of the year. This will mean a reduction in cost of from ½ to 2 3 of a cent per lb.

Further reports have been received of new activites of the Company in the north. It is stated that a bond has been taken on the Outsider Group, consisting of eight claims, situated at Maple Bay on the Portland Canal, about 35 miles from the town of Stewart. This property was located by William Noble and G. M. Collinson in 1903. It was sold by them to the Brown-Alaska Co. in 1905. The latter shipped 14,500 tons of ore to the Hadley Smelter, Prince of Wales Island, Alaska. The returns on these shipments gave 3% copper and averaged about $1.00 in gold and silver to a ton. During this period a Riblet tram 1 mile in length was built to the beach, where a 1,000 ton bin was constructed. The plant was closed in 1907. New interests acquired it in 1908. There followed a long period of inactivity until 1917, when something like $35,000 was spent on development work, the results of which have been encouraging. The Granby Co. are said to have given the contract for further tunnelling and general exploration. Over 200,000 tons of ore have been blocked out and shipments to the Anyox smelter will commence next season.

Mineral Exhibit in London

Samples of the minerals of British Columbia are being collected under instructions issued by the Hon. Wm. Sloan, Minister of Mines, for the purpose of augmenting and bringing completely up to date the exibit at British Columbia House, London, England.

In the past few years there have been many new mining properties opened up in this Province. Some of these are in the Kootenay, others in the Boundary zone, and not a few in the North. Among the latter are those of the Portland Canal district. It is the intention that all these properties shall be represented in the display in the Old Country. The work of getting first class examples of the ores of such properties, and of procuring specimens of what new minerals have been brought to light, has been under way for several months. When the shipment finally goes forward it will be in such shape that visitors to British Columbia House will be able to ascertain at a glance the character of the outstanding minerals of British Columbia, as well as obtaining an idea of the appearance of the ores of the better known mines, such as the Premier and the Sullivan.

Already there are a number of large cases of samples, carefully selected and indexed, in the offices of the Provincial Mineralogist awaiting shipment to England. These are for the Empire Exhibition of 1923. They are thoroughly representative and it may be assured will constitute an exhibit that will be a credit to this Province.

Copper Deposits on Vancouver Island

The Gabbro Mines Ltd., whose properties are situated on Jourdan River, west coast of Vancouver Island, have been doing much prospecting development during the past two years. This year two new zones, known as the "Stewart" and the "Pat", on the Vulcan No. 3 Claim, have been opened up. These are important as establishing the continuity of the ore body on the east side of the river. The "Corfield" zone has been opened on the Black Hornet Claim, west side of the river.

Adjoining these holdings is the mine of the Sunloch Mining Co. There has been little development recently on this property. The management is marking time, pending the installation of the promised concentrating mill. An announcement was made by the Consolidated Mining Smelting and Power Co. two or three years ago that an appropriation of approximately $125,000 had been made for this work. The project has got no further, however, no doubt for the reason that the price of copper still is low.

Test of Dome Mountain Ore

Thos. J. Jefferson, mine operator interested in northern British Columbia holdings, states that the development of his property on Dome Mountain this summer has been very satisfactory. A trail shipment of ore containing high gold values has been sent to the smelter for treatment. The results are to be taken as a guide for plans in the future. Next year he proposes diamond drilling, the drill to be taken to the town of Telkwa during the winter to be ready for an early start in the spring.

Dolly Varden Owners Issue Shares

The Northern Mining Properties Ltd. are issuing shares to the creditors of the defunct Taylor Mining Co. Ltd., of Vancouver B. C., which formerly operated the Dolly Varden Mine at Alice Arm.

Big Block of Galena Found

It is reported that miners working on the claims of J. C. Pitts, a merchant of Invermere B. C., have uncovered a solid block of galena measuring in the rough

Silver property in Utah, and a gold dredging property in New Zealand.

Lake Shore Shaft

The Lake Shore has completed the enlargement of its shaft to a depth of 400 feet, and now has a three-compartment shaft to the 600-foot level. When power is again available, sinking to the 800 foot level will be started, preparatory to the enlarging of the mill.

Teck-Hughes

It is understood that directors of the Teck-Hughes are considering a proposal for paying off the bonded indebtedness in a series of instalments. If this done there is nothing to prevent the company going on a dividend basis almost immediately.

Activities in Skead Township

There is considerable activity in Skead Township, and it is understood that A. D. Miles, representing English interests who recently took an option on the Skead Gold Mines, has also taken over the Telluride claims. The Flannigan claims have been optioned to A. J. Young and associates, while the Mines Finance Corporation has taken an option on the Malen group. Diamond drills are now at work on the property of the Skead Gold Mines.

Engineer to Be Appointed

At a meeting at Toronto of the shareholders of the West Dome and Dome Lake it was decided to liquidate these companies in order to facilitate the distribution of the stock of the Consolidated West Dome Lake. The latter company was formed to take over the two companies, and old shareholders will receive one share of the new stock for two shares of the old.

Paymaster Report

Another sensational discovery has been reported on the surface of the Paymaster property. A few weeks ago this company tried to create excitement by reporting a find of $15,000 ore on the 300-foot level. It is not difficult to obtain [illegible] assay from almost any of the Porcupine properties, and the publicity given to this statement emanated from company officials, leads one to believe that the company has an eye to stock disposal.

Properties to Be Re-Opened

It is understood that arrangements are being made to resume operations at the Fairlie-Murray-Mcgeridge and Baldwin properties, which lie a few miles north of Swastika. These properties have shafts down to a depth of 200 feet.

Pamour Lake

The Pamour is reported to be encountering very encouraging values in the Pamour Lake property new vein which was found at a depth of 275 feet. The vein has a width of about [illegible] and values are reported to be very high.

Big Increase in Gold Production

Northern Ontario gold mines have produced over $2,000,000 during the month of September, which establishes a record for Ontario mining. While the October output will probably not be as high as this, on account of the shutdown at Kirkland Lake due to the shortage of power, it is hoped that this record will be beaten during the remaining months of the year.

The Hollinger has established a new high record with an output of 33,162 tons valued at $13.51 a ton from 31,304 tons of ore milled, treating over 1100 tons per day. Improvements continue to be made, and the Hollinger also established a new high record, and is now treating 4500 tons per day. It is anticipated that with the new crushing plant that is being installed, production will soon be 5000 tons per day.

McIntyre is also breaking into new ground and establishing new records. The recent discovery on the 1875-foot level has given the mine a new lease of life. No. 7 vein, which is a continuation of the 84 vein on the Hollinger, has been developed for a length of 800 feet, giving an average of approximately $20.00 per ton. To the west there remains 400 feet of undeveloped ground to the Hollinger boundary, in which the ore has been indicated by diamond drilling, and a further 400 feet to the east has also been indicated by the drills. This would given a length of 1600 feet on the McIntyre ground. This vein has been the most important producer yet found on the Hollinger, producing to date $15,000,000, with an estimated reserve of over $6,000,000 above the 800-foot level. Practically no work has been done on it in Hollinger ground below that depth.

NORTHWESTERN ONTARIO

Prospector's Licenses at Kenora

One hundred and seventy mining licenses have been issued here since the rush to Red Lake started a little more than a month ago. Some fine samples of gold quartz have been brought by prospectors, who state they took them from veins not far from Red Lake, although neither near the silver find nor in a similar rock formation.

Mikado being Unwatered

The Mikado is now unwatered to below the sixth level. Twelve men are at work, and thirty more are to be put on immediately. Those interested in reopening the property profess to have ample financial resources to carry on until the spring, when it is expected results will have warranted more serious operations. Col. Machin is showing some gold in quartz, taken from the surface at a point about 400 feet from No. 2 shaft, that are of the same sensational nature as used to come from the Mikado formerly when the mine was active.—C. A. B.

NOVA SCOTIA

Agreement May Bring Prosperity to All

Now that the wages agreement is signed to cover a period of eighteen months, we can expect the co-operation of miners and management in an attempt to bring back prosperity to the coal mining communities of Nova Scotia. President Dan Livingstone of the United Mines Workers Local, has expressed high hopes that the present agreement will be beneficial to all concerned. The high level of wages makes the common benefit somewhat doubtful as far as the Company is concerned.

A Busy Winter Promised

Shipment of coal continues to be brisk and will probably remain so until the season for navigation closes. Last week the prospect for continued activities during the winter were not bright. The recent order for 5,000 tons of rails has altered the case, and it appears now that not only will the steel plant be busy during the whole winter but as a consequence the mines also will be enabled to work more nearly to capacity.

19 by 19 by 20 inches. It is estimated to weigh approximately one and a half tons, being practically solid sulphide. Arrangements are being made to have it exhibited as a specimen of British Columbia mineral.

Dr. Dolmage Announces Silver-Lead Find

Dr Victor Dolmage, of the Canadian Geological Survey, recently lectured to the Victoria Prospectors' Association on the Vancouver Island minerals and mineral formations. The speaker referred to the Old Sport and Tidewater properties as being good examples of the mineralization of the Island and announced the discovery at Quatse Lake, near Coal Harbour, Quatsino Sound, of a body of galena carrying good silver values. It occurs in limestone on a contact with a colored granite that may possibly be of Tertiary age. Dr. Dolmage also described some peculiar dykes of volcanic glass that he examined in the Douglas Channel area last year as well as of beds of volcanic tuff that have been deposited on glaciated surfaces of the Coast Range granite.

B. C. Coal Reserves

It is estimated that the coal resources of British Columbia total 73, 874,942,000 tons. This includes an actual reserve covering 439 square miles and containing 23,831,242,000 metric tons, as well as a probable reserve of approximately 6,195 square miles containing 50,043,700,000 metric tons. These figures were compiled recently with a view to arriving at some conception of the value of the natural resources of the Province. They are illuminating as an indication of the possibilities of coal mine development in this section of the Canadian West.

Good Production at Crow's Nest

Figures showing the production of the Crow's Nest Pass Coal Co., Coal Creek, last month are not yet available, but it is expected that they will be about the average, notwithstanding the prolonged period of inactivity owing to the recently settled strike. The mines have been kept in first-class condition. There was nothing to prevent an almost immediate resumption of production on a normal scale, except an unexpected shortage of railway cars.

The Normandale is a new colliery opened up near Nicolas, B. C., which made its first shipment last August. The coal is a high-grade bituminous. It is necessary to truck the product for two miles to the Kettle Valley Ry. Mr. Ewart is in charge of operations. Vancouver City capital is invested in the enterprise.

Advertisements other than "Employment Wanted" or "Employees Wanted" will be inserted in this department at the rate of 20 cents per agate line (14 agate lines make one inch). $2.80 per inch, each insertion, payable in advance. Space measured from rule to rule. When four or more consecutive insertions of the same advertisement are ordered a discount of 25 per cent. will be allowed.

Advertisements of "Wanted Employment" or "Wanted Employees" will be inserted at the rate of two cents a word, net. Cash must accompany order. If box number is used, enclosed ten cents extra for postage in forwarding replies. Minimum charge 50 cents.

CHEMIST, experienced in blast furnace and steel plant work, ores etc., desires position. References. Address Box 521, Canadian Mining Journal, Gardenvale, Que.

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Addresses of advertisers, whose names appear in the following classified index, may be found upon reference to their advertisements. An alphabetical index to advertiserswill be found on the page facing the inside back cover. The following regulations apply to all advertisers:—One-eighthpage, every issue, three headings; one-quarter page, every issue six headings; one half page, every issue, twelve headings; full page, every issue, twenty-four headings.

Buyers who are unable to find in the classification heregiven such machinery or supplies as they desire are invited to write Service Dept., Canadian Mining Journal, Gardenvale,Que., who can in all probability, refer them to proper sources.

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Mine & Smelter Supply.

Ball Mill Feeders:
Engineering Equipment Co., Ltd.
Herbert, Alfred, Limited
Holman Bros., Ltd.
Hull Iron & Steel Foundries, Ltd.
Mine & Smelter Supply.

Ball Mill Linings:
The William Kennedy & Sons, Ltd.
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Canadian Link-Belt Co., Ltd.
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Hendrick Manufacturing Co.
Herbert, Alfred, Limited
Holman Bros., Ltd.
The William Kennedy & Sons, Ltd.
Peacock Bros., Ltd.

EDITORIAL

The maritime and mineral resources of the Acadian provinces constitute them the Great Britain of Eastern America; and though merely agricultural capabilities may give some inland and more southern regions a temporary advantage, Acadia will in the end assert its natural pre-eminence.—Sir William Dawson—1878.

CANADA'S COAL — A FORECAST

Mr F. W. Gray, formerly editor of the *"Candian Mining Journal"* and now once more on the staff of the British Empire Steel Corporation has submitted for the President's Prize Competition of the Canadian Institute of Mining and Metallurgy a paper on the *Development of the Coal Industry in Canada*. This has been published in the October issue of the Institute's Bulletin. We wish to draw attention to it as one of the clearest and most authoritative estimates of our national fuel supply that has yet been published. It is from the pen of one of the few Canadians who have studied our fuel problem in a comprehensive and disinterested way. Mr Gray has made the study of coal his life's work and has applied to the task without stint both the energy and the discretionary power of which he is capable in eminent degree.

After pointing out that to secure our coal supply mainly from abroad as a mere matter of convenience and expediency is a pernicious principle and contrary to the true interests of our country, Mr Gray reviews our present sources of fuel and shows how Canadian sources can be used to greater advantage. For domestic purposes we use principally Pennsylvania anthracite, an ideal fuel for such use. This is becoming more and more a luxury. It is probable that dense coke made from bituminous slack coal in by product ovens will replace anthracite for domestic purposes in Canada within a measurable period of years.

The problem of using Canadian bituminous coal is primarily one of distribution. There is plenty of coal in both east and west and we must discover ways and means of making it available as far into the centre of the Dominion as possible. Nova Scotia with coal reserves that are comparatively small, can produce economically ten million tons per annum which is about twice its present production. It is probable that this coal can be shipped with economy as far west as a line joining Ottawa and Brockville. West of that it will be expedient to use imported coal until it becomes feasible to use western Canadian coal at, say, Fort Frances. Throughout the west our fuel supply is assured for all time, in any quantity that may be required.

The feature that will mark the development of coal mining in Nova Scotia, where there is already a unified control and a consistent policy of production, is economy of production by means of all possible means such as labour saving devices, efficient underground transportation, a more complete saving of coal, and the preparation of cleaner coal for market. In the west the production of coal is still in a somewhat chaotic condition, due to its virtual omni-presence and the consequent irrational competition. A commencement has been made already in the Western Canada Coal Operators' Association, to coordinate the aims of the various operators, which are at bottom identical, and to ensure a maximum of efficiency in the total production.

Looking to the future, Mr. Gray makes some shrewd estimates as to what Canada's requirements for fuel will be. Basing his estimates of population for the next thirty years on the growth of the United States population a century ago, and making due allowance for the effect of our more rigorous climate on settlement, he finds that by 1950 Canada will have a population of 8,000,000 from Manitoba westward, which will consume 12,500,000 tons of coal. Most of this coal will come from Alberta mines, and its increased quantity will be dependent almost entirely upon increase in population. The Vancouver Island mines will have a comparatively small production, as indicated above. Of the 52 million tons of coal estimated to be mined thirty years from now, 38 million or 73 per cent. will be mined in Alberta, Saskatchewan and eastern British Columbia.

The central part of Ontario will require an increasing amount of bituminous coal from the United States, where the superabundant supply will be available except in such cases as that recently experienced. This will not be balanced by any corresponding export of Canadian coal. "Generally speaking it does not seem probable that Canada will become a dominating factor in the export coal trade of the world, although the country can play a respectable role in this way for an indefinite period ahead. Canada's chief hope of benefiting from coal deposits within her borders is by a combination of domestic industries and agriculture, and the development of a

"wholesome fear among our people of too great a de-"pendency on the United States coal fields."

In conclusion, the alternatives to coal as fuel are mentioned—electricity, peat and oil from shale. They may be important locally but do not affect the general issue materially.

We have noted Mr. Gray's paper thus at some length not only because of its outstanding intrinsic merit, but because it presents a foundation upon which we propose to build. Canada's fuel problem is so pressing and so serious a matter to one and all that the "*Canadian Mining Journal*" intends to keep it constantly before its readers in such a way as to induce a more extended use of domestic fuels. We all need education along this line. If we can expand Mr. Gray's resumé into a series of expositions, equally authorative, elucidating each of his various principal conclusions, we shall have a solid body of information on which to act. This the *Journal* intends to do during the coming months.

PROSPECTING VERSUS THE "RUSH"

The favourite season for "rushes" to new mineral finds is upon us, yet there is a surprising scarcity of those wild scrambles. It cannot be for lack of men to follow a rush, for the woods have been full of prospectors and would-be prospectors during the season just closing. Nor can it be for lack of an excuse for a rush, for some of the most famous of these have been based upon the flimsiest of pretexts, or even upon bare-faced scheming with no find whatever in the back-ground.

It seems more likely that our prospectors, having been led astray so often by a false scent left by the feet of an incompetent or an unscrupulous fellow-prospector, have now adopted generally the habit of marking out their own courses and sticking to them. In other words, prospectors today are more inclined that formerly to work out their own salvation by means of a consistent and well-directed search, rather than to depend upon following up, helter-skelter, the tracks of a successful comrade in the hope of sharing in his lucky strike. True, so often as there is a strike there will be a congregation of prospectors and an intensive search in the vicinity that will aid not only the original discoverer but the progress of the area as a whole. A certain amount of "rushing" is legitimate and useful. It is the "rush" in excess that aids no legitimate object and wastes a deal of money and of human effort.

A consistent plan of work is available to a much larger fraction of our prospectors now than formerly. Prospecting has become more of a recognized trade or profession than it was twenty years ago. It is no longer merely the resort of the odd character, impelled by unknown forces to wander through forest or desert, cut off from his kind and regarded almost as a separate species. The prospector of to-day informs himself, as well as may be, about the minerals for which he is searching and the known facts of their occurrence. He avails himself of every aid the geologist has to offer, and is capable of applying logically to the work in hand the data obtained from working deposits and from field mapping. He is no longer hunting for a needle in a haystack; he is following a thread through a maze of thickets and rocks—a thread broken, no doubt, at intervals, but sure to lead him to his goal in the end if he persists and uses his head.

Prospecting is at present in a period of transition. The "rush" belongs to the old order rather than to the new. It is a picturesque feature of the search for mineral deposits, and it will always remain, albeit in modified form, so long as "strikes" are made. Our mineral industry will benefit materially from the transference of a large part of the energy consumed thus fruitlessly to a search directed upon more modern and saner lines.

FIRE CAUSED BY NEGLECT

There seems to have developed quite an air of mystery about the origin of the devastating fire in Temiskaming district three weeks ago. Actually there is no mystery whatever about it. It is a plain case of neglect on the part of persons who should have known better than to run the risk of conflagration. It is of the utmost importance to our northern mining communities that recurrences of such fires be prevented. Hence, at the risk of repetition, we shall state the case once more, and even more clearly.

Four days before there sprang up the gale that fanned the flames to the danger point, a mining man, well versed in the ways of the woods, travelled along the Temiskaming and Northern Ontario Railway from Cochrane to Cobalt. The countryside was wrapped in a pall of smoke. Everywhere settlers were burning slash. A casual inspection showed the woodsman that the fires had burned through to the clay below, and were spreading laterally at will. A hundred miles of dry fuel, continuous almost throughout, had been kindled in a thousand spots. Winds were bound to come. Only an act of God, in the form of rain before the wind, could avert the impending catastrophe. That rain came too late.

This is, briefly, the whole story, so far as it can be learned in the devastated northland. Commissions of investigation there will prove fruitless. It is in Toronto, at the seat of the provincial Government, that investigations must be instituted.

So long as settlers, and others, are allowed to burn slash from their clearings while there is danger of the fire getting beyond control, just so long will forest fires inevitably ensue. It has been demonstrated a thousand times, and it has been accepted as a fact, that it is unsafe to leave the question of safety in this case to individual judgment. That is the basis of the laws and regulations directing the use of fire in forested areas. We maintain admi-

nistrative officials and a corps of fire rangers to enforce these laws and regulations.

In the present instance either the regulations have been inadequate on their enforcement has been lax. In either case our public officials in Toronto need not go beyond the walls of the Parliament Buildings to fix the responsibility for the disaster and to provide, so far as is humanly possible, against further costly mistakes.

BELCHER ISLANDS IRON ORE

Dr. G. A. Young's report on the iron ore of Belcher Islands, summarised in this issue, makes it obvious that Canada's iron ore problem will not be solved by means of an unlimited supply of high grade ore from that part of Hudson Bay. That quarter of Canada is an old stamping ground for Dr. Young, for he was a member of Dr. A. P. Low's expedition of 1902-03 which examined a long stretch of the adjacent coast of Hudson Bay, spending two summers and a winter on that cheerless coast. The results of those seasons' work have never been made public formally; but it has become known informally that iron ore, which was the prime object of the party's exploration, was found to no greater an extent than that on Belcher Islands now under discussion, though vast areas of iron formation similarly were located.

After examining in detail forty miles of outcrop of the iron formation of Belcher Islands and having his samples analysed, Dr. Young's conclusion is that no ore of commercial grade is available. It is possible, though not probable, that high grade ore lies concealed by drift.

Perhaps it is fortunate that the ore available in the far-off islands is of so low a grade as to preclude its use until the ore of many an iron range, much nearer civilization, is subjected to a process of beneficiation. If, for instance, Belcher Islands had ore of the purity of the Minas Geraes region of Brazil and in similarly vast amounts, capital might be induced to attempt its commercial use. Even if the ore were of perfect quality it is not likely that it could be used.

Belcher Islands are 470 miles by water from Moose Factory, Moose Factory is 200 miles from Hearst. From Hearst it is 150 miles by rail to Michipicoten Harbour on Lake Superior. Even the most direct route to a market, would require the building of 200 miles of railway, a special fleet of boats and Lake ore-handling terminals. The whole cost of this would have to be charged against the ore deposits with the possible exception of a small part of the railway that would pass through agricultural land. Via Cochrane and South Bay to Georgian Bay the capital charge would be somewhat less but the railway haul would be longer. The season of navigation on James Bay and Hudson Bay is short, not four months at most, so that the equipment would be idle for eight months of the year unless stock piling were resorted to to cover that period. Belcher Islanders could not and coke fuel would have to be brought by rail or boat. Experience has shown that the Esquimaux are not capable of consistent toil, so labour charges would be inordinately high.

All told, it is just as well that the vague hopes we had formed of Belcher Islands as a source of iron ore for Canadian furnaces should be definitely abandoned. The present authoritative report gives little, if any, encouragement for a revival of these hopes even in the remote future.

CLEAN COAL

Ten years ago there was a growing interest among buyers of coal in its quality. The habit was spreading rapidly of buying coal on the basis of its calorific value, the percentage of ash being the principal controllable factor affecting this. The shortage of fuel throughout the latter part of the war period and the succeeding years of abnormal conditions has tended to set back this advance. Now it is high time that a concerted and consistent effort be made to resume our progress along a road that will lead us to true national, as well as personal, economy. In the central part of Canada particularly, where the coal supply is brought long distances by rail, there is an appalling loss annually through the carriage of fuel that contains not less than ten to twelve per cent. ash, and often as high as twenty per cent.

In at least one case, the initiative has been taken by a coal producer. The Dominion Coal Company, threatened by an impending avalanche of cheap coal from Virginia, has undertaken to improve the quality of its product. This policy is sound and far-sighted, and is certain to redound in the long run to the financial benefit of the Nova Scotian coal mines. From now on quality in coal, as in other things for sale, will have added importance both to buyer and to seller.

To-day we print a resumé by Mr. John Moffatt of the means whereby the management of the Nova Scotian collieries are improving the quality of their coal. We draw attention to it as exemplifying one of the numerous and diverse means whereby Canada's fuel problem can and will be solved.

WHEN WINTER COMES*

I've got an office and I pay the rent,
For weeks I've taken in not one red cent
I've got my card in several magazines,
I've joined two clubs—you may know what that means
Of course a fellow's got to have a front;
He can't go round appearing like a runt
And so I have a tailor bill or two
That show some signs of getting overdue
And at this supercritical conjuncture
Financially I'm nothing but a puncture
For, though affairs may swiftly reach a crisis,
My bank account displays sure signs of phthisis.

ANON

*[Editor's Note:—We take strong exception to the implication that any mining engineer, wise enough to take this infallible means of insurance against unemployment could be in such a bad way.]

Coal of Quality

EFFORTS IN NOVA SCOTIA MINES TO PRODUCE BEST COAL

By JOHN MOFFATT

Due to the insistent demand for coal during the war period quantity rather than quality took first place. This tended to carelessness in picking out the refuse material both in the mine and at the picking belts where coal is finally cleaned and assorted. With a stagnant market, the demand for clean coal has returned and the emphasis is laid on quality. Instructions have been issued to all Nova Scotia miners to clean the coal in the mine and see that it is sent up in good marketable condition. For a time a few of the workmen scouted the order for better coal, but the Company was imperative and before long clean coal was being produced from all the mines. But quality implies size, and so efforts were directed towards increasing the percentage of lump coals. This is not as easy as cleaning the coal. The method of mining, the use of explosives, transportation and handling of coal have much to do with its condition when it reaches the market. Friable coal suffers badly from handling, so the whole matter was reviewed and an enquiry begun having in view a larger output of lump coal.

Improved Method of Undercutting

The method of mining in relation to deep and low undercutting was considered. Undermining by coal-cutting machines gives a certain known amount of slack coal according to the kind of machine used. Machines of the puncher type give less slack than the Radial type in the cutting, and the undercut is not only higher but is so made that when the coal is blasted puncher coal falls well out and breaks into much larger pieces. It is easier to load away and requires less digging out and yields a larger amount of good marketable coal than if cut by a machine of the Radial type.

The undercut of the Radial is very low and when deeply undercut the coal after blasting simply settles down in a mass and has in large measure to be dug out by hand. Miners know that to shatter a large block of coal with one shot requires a large amount of explosive. If the block is not thrown outward or downward some considerable distance, it has little chance of being broken into lumps as required. A narrow undercut necessitates an extra large charge of explosive to meet this condition. Too much explosive in blasting pulverizes the coal and tends to give a large amount of slack. In order to obviate this the radial mining machine has been improved lately, and a new device attached that can be used to break down the front of the undercut and make it higher. This snubbing off will not appreciably increase the amount of small coal, as this work is done when the undercutting has been well advanced. It will not only increase the amount of lump coal but, by allowing a smaller quantity of explosives, coal mined in this way will be less shattered and will stand transportation much better.

More Satisfactory Explosive Being Sought

The quantity of explosive and the kind used have much to do with breaking the coal. When loose black powder was used in Nova Scotia collieries it was no uncommon sight to see a whole shot fall in one lump of twelve or fifteen tons. As the mines grew deeper and more dangerous the use of black powder, which nearly always flames in firing, was prohibited and a safer explosive was introduced. Finally the use of permissible explosives became general and safety in blasting became a larger factor in mining than the quality of coal produced. High explosives are rapid in action and are more suited to the blasting of rock than of coal. This is becoming more and more clearly recognized, and the Dominion Coal Company are seeking an explosive that will do the work with less of a shattering effect.

Experiments are now being made with a powder of slower action. Daily records are kept of the quantity of powder used per ton of coal. If the results show equal strength to that of the powder in use and more coal of larger sizes firm enough to stand handling, some progress will have been made. The tests, to be conclusive, will be carried on for a considerable time and in different collieries. Reports from the mine, from the screens and from the shipping piers will be examined, and if the final result shows an increase in larger sizes of coal, everything else being satisfactory, a gradual change of explosives may take place.

Method of Mining Affects Quality

The placing of a hole has much to do with the quality of the coal. Usually holes are bored along the rib directly over the undercut. The rib coal acts as a lever and much of the shattering force of the explosive is spent in the solid coal. Holes improperly placed, just as holes over-loaded, give a large quantity of the finer sizes. Too many holes tend to much breakage and the fewer the holes used, the larger the coal and the better the quality.

The method of mining is therefore of great importance. If a seam seven or eight feet thick can be undercut on the bottom and brought down without splitting it, a larger amount of lump coal will be obtained; but, if seams of this thickness are worked on the fall and bench system, too many holes are required and too much small coal is made. We know that some mining men do not agree with this opinion, but a long experience in the collieries of Cape Breton and Nova Scotia supports the statement.

Forty years ago all coal in Nova Scotia was mined by hand. The cut in Cape Breton collieries was made on the bottom. A method was adopted by which five-foot undercuts could be made. By keeping one-half of a twenty foot room three feet ahead of the other half and shearing in the center, one shot on each side brought down the whole room, filling it up with coal of the best quality. Records show that when an extra effort was made, the amount of lump coal ran as high as 87 per cent. The average, however, was from 75 to 80 per cent lump. When a call for a superior quality came in, miners were prompt to respond, and coal of the finest quality was sent up. The mining, the shearing, the boring, the blasting and the loading of the coal was all done with that fine art of the hand-pick miner, which, through the introduction of machinery, is fast disappearing from the coal mine. The "will to do and the hand to dare" was there and great slabs of coal, too large sometimes to pass over the screens,

found their way out of the mine and had to be broken on the surface. Miners found great delight and much satisfaction in producing the kind of coal called for, and they chuckled as they rolled great lumps of coal, too heavy to lift, up on props or planks into the pit boxes—"for their's was the joy of work well done, the greatest of all joy under the sun."

There were collieries where coal was riddled into the pit car and the slack left in the mine and yet the tonnage rate was less than half of what is paid today. In winter it was 32c per ton. This was laborious work and most unfair to the miner, who received nothing for his extra work.

After riddling underground in order to place large coal on the market was abolished, screens of a large mesh were erected on the bankhead of one colliery and miners were paid according to the weight of coal passing over them. This system was most unpopular. The Company styled the new screen the "bully fair play" but the humor of it all struck the workmen, who gave it the opprobrious epithet of "bully foul play" under which name it died at the hands of the local government.

Specialized Mining

The first mining machines introduced were of the puncher type and undercut on the bottom. The system of mining remained the same as when the hand picks were used. Indeed the introduction of machines had to be made in such a way as not to displace too many hand picks, and for a long time a united front prevailed. The pillars today are nearly all drawn by hand pick miners. With machine mining, specializing took place and instead of all the mining from placing down by one man, it was broken up into parts so that we now have the machine miner, the shooter and loader and the shot firer. A division of work and the introduction of a large amount of raw labor caused by the expansion of the coal trade led to a loss of individual responsibility for the quality of the coal produced. This was largely overcome by the appointing of coal inspectors whose duty it is to go through the mine and see to it that all workmen, with the object of sending up coal of large size.

Where [illegible] coal seam seven or eight feet thick must it be mined in the center or by what is known as "the full and bench system" coal is more liable to be broken into small sizes. This system usually entails the use of a [illegible] shots. The amount of explosive [illegible] in the aggregate and because of the [illegible] of the coal is much shattered. It sometimes happens that a great depth the middle of a coal seam [illegible] the vertical pressure, and there is no chance [illegible] the full and bench system.

[illegible] Coal Carefully Supervised

Before mechanical [illegible] to an examination of the coal by the [illegible] and screening tables, the chutes both at the [illegible] and the shipping piers. Where the chute [illegible] the slope changes were made to lessen the fall of the coal. Coal is fed to the picking [illegible] by means of all foreign material being removed.

Which is noticed that coal from certain sections is dirty [illegible] the attention of the coal inspector is drawn to it. He immediately makes investigation in the mine [illegible] a more friable section of coal has been [illegible] explosive is being used or proper care has not been taken to clean the coal before it is sent out. Whatever the cause, it is ascertained and, if possible, it is removed.

Care is also taken to have all coal sent out of the mine in a dry condition. Where the grade is uniform and the seam regular this is easy; but where the floor becomes irregular and grading becomes difficult, water gathers. Coal from such places usually finds its way to the fire doors without passing over the screens and mixing with other coal.

A special coal inspector has been appointed in each colliery whose duty is to see that coal is sent out of the mine in the best possible condition. If at the screen tipple he finds the coal too small he proceeds at once to the section of the mine producing this coal and finds the cause. He reports to a chief Inspector who in turn passes a copy of this report to a regular mine Inspector who at once makes a closer investigation. In this way the collieries are all under special supervision and no practice tending towards the production of dirty coal or of inferior sizes can be carried on for even part of one day without falling under the notice of the management.

The coal companies of Nova Scotia have determined to supply coal in the best possible physical condition and of good quality and, from what we known of their plans, they will succeed.

METAL USED IN AUTOMOBILE CONSTRUCTION

Figures concerning 1921 consumption of materials by the automotive industry have just been published which disclose facts of unusual interest.

The automotive industry uses 1,464,000 tons of iron and steel a year—or approximately four per cent. of the total output of the United States. 43,250,000 pounds of aluminum were used in 1921 in manufacturing cars and trucks or twenty two per cent. of the total output of aluminum. The manufacture of automotive vehicles required the use of 83,125,000 pounds of copper—sixteen per cent. of all the copper mined in the country. One fifth of all the tin used in the United States is used in the automotive industry—some 12,510 tons a year. The Tanners Council estimates that 54,000,000 square feet of upholstering leather was our 1921 output, and of this amount 37,165,000 square feet were used in making comfortable seats for automobile and truck passengers. In addition, more than 88,000,000 square feet of imitation leather was used in upholstering (figure that out in acres for yourself).

Although the amount of wood on the average car does not seem to be worth mentioning at first glance 315,800,000 board feet were used by this enormous industry last year.

When one speaks of plate glass, one generally thinks of department store windows, but thirty per cent. of all the plate glass made in the country, or 16,500,000 square feet was used in manufacturing everything from roadsters to five ton buskies. It required nearly 6,000,000 gallons of paint and varnish to dress up our motor cars last year, and it took 16,000,000 pounds of hair and padding to make comfortable seats. Aside from these items 60 million pounds of lead, 3,100,000 pounds of nickel, 5,337,000 yards of upholstering cloth, and 15,340,000 yards of cotton material were some of the items in the raw material bill. Figure.

The Industrial Digest

The Iron Ore on Belcher Islands

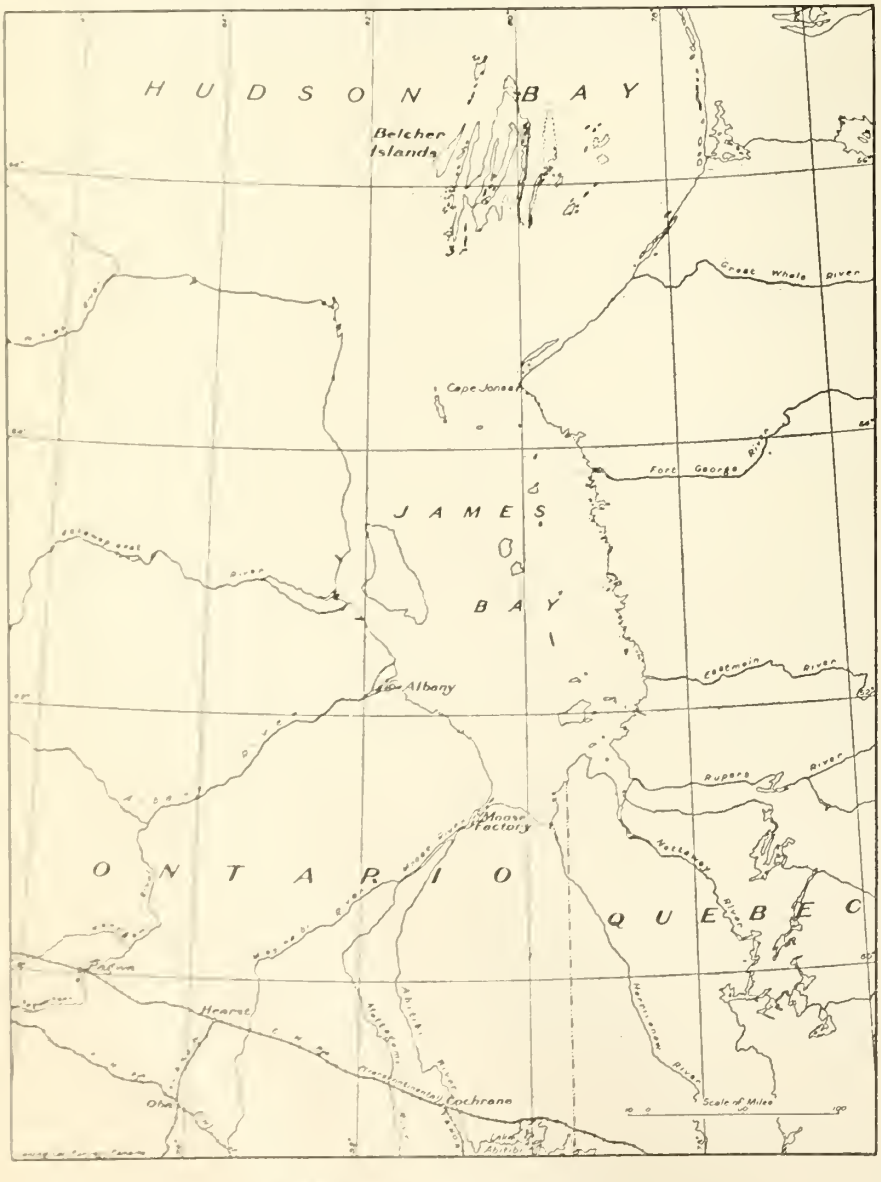
There has just been published by the Geological Survey, Ottawa, as Summary Report, 1921, Part E, *Iron-bearing Rocks of Belcher Islands, Hudson Bay, by G. A. Young.* This report of 61 pages, with three sketch maps, gives in its first three sections a comprehensive account of the geological occurrence of the extensive beds of iron formation, and in its final chapter a non-technical discussion of the economic features of the case.

The iron formation is of the banded siliceous type common in Ontario, 300 to 450 feet in thickness. It is underlain immediately by quartzite, and beneath that by slate and limestone. Above it in the sedimentary series is ellipsoidal basalt, from which it is separated, however, by a thick sill of diabase intruded uniformly at the juncture of iron formation and basalt. The rocks have been folded into a succession of antielines dipping at various angles up to the vertical, along the eroded tops of which the iron formation now is exposed. These north and south folds give to the Belcher Islands their elongated shape. It is suggested that the sedimentary rocks are Animikean in age.

Extent of Iron Formation

The exposures of iron formation and of iron ore are along the eastern edge of Flaherty Island, the prineipal island of the group, and a long peninsula that skirts its eastern side, and on two long islands that parallel this side at a distanee of from six to twelve miles. The parallel outerops of iron formation are parts of one bed, folded and then eroded so as to present these various exposures.

Dr. Young examined about 40 miles of the outerop of iron formation and observed it at a distanee, from a boat, for an additional length of 70 miles. From the outerop thus determined and from data as the dip of the strata he estimates that at least 150 square miles of land surface is underlain, at no great depth, by iron formation. Of the 40 miles of outerop examined, only 10 miles was sufficiently well exposed to allow of the unreserved statement that beds of iron were present or absent. With an unimportant exeeption, the general character of the iron formation was the same throughout.



By Courtesy of the Geological Survey.

BELCHER ISLANDS HUDSON BAY

Iron Formation underlies 150 square miles of land surface on the eastern side.

The Ore

"In each area examined the several outcropping bands of iron formation (highly ferruginous bands were found, and where the formation was fully exposed two or more such [illegible] were always encountered. In thickness the individual zones vary from 10 feet to 50 feet." Four representative samples across the zones gave iron from 35 to 45 [illegible] from 16 to 32%. A picked sample gave [illegible] and silica 24%. The ferruginous zones contain [illegible] capable of removal by hand picking, when the ratio of the zones would reach 50% iron [illegible] and the silica would be reduced to 20.

It is probable that these ferruginous zones owe their comparatively high content of iron to the character of the original deposition and not to any process of concentration such as causes the formation of commercial ore-deposits on the Mesabi range. However, as the character of the iron formation is not in distinction to some found in Ontario, such as to preclude the possibility of concentration to [illegible] it is possible that ore deposits of [illegible] grade occur, though now effectually concealed as a result of drift.

In conclusion Dr. Young points out that since the sedimentary beds are essentially horizontal in character and regular in their disposition, the work of exploration "should consist of [illegible] examination of complete "natural or artificial [illegible] sections of the iron "formation [illegible] along the course of each "outcropping band. Such prospecting he recommends in preference to [illegible] diamond-drilling which in this case would be resorted to only when the outcrops had been examined thoroughly.

STRUCTURAL MATERIALS ALONG THE ST. LAWRENCE

The Mines Branch, Ottawa, has recently published a *"Report on Structural Materials along the St. Lawrence River, between Prescott, Ont., and Lachine, Que.,"* by Joseph Keele and [illegible] Cole. It is a volume of 120 pages, accompanied by three maps on a scale of a mile to the inch, showing the areas investigated, and well illustrated with photographs.

This report illustrates the growing tendency toward inter-departmental co-operation in our administration at Ottawa. The Mines Branch undertook, in 1919, at the behest of the Dominion Power Board, an examination of the [illegible] for materials suitable for the building of concrete for the projected canal and power developments. The report of Messrs. Keele and Cole was so complete and thorough that the Dominion Power Board recommended its publication for general purposes.

The area covered (1,000 square miles) comprises a strip six to eight miles wide, mostly along the north shore of the St. Lawrence. The geological map distinguishes between [illegible] rocks and clay and gravel deposits, [illegible] and peat. The materials [illegible] are limestone and clay for cement manufacture, and sand, gravel and crushed stone for [illegible].

Of the materials for making cement, suitable clay is available [illegible] localities, but limestone of the requisite [illegible] only in two localities, both near Cornwall. [illegible] are commercially available only in [illegible] quantities.

Sand [illegible] of the quality suitable for concrete are available only in small scattered deposits. Consequently recourse must be had to crushed limestone and screenings for the construction of any large works. Limestone for such a purpose can be got conveniently at numerous places on the shores of the river, and distributed cheaply in barges.

The report deals briefly with rock for road building and with materials for the making of brick. As brick and drain tile will be used to an increasing extent in the future, a number of promising localities for their manufacture are pointed out.

Deposits of pure silica occurring as sandstone at Beauharnois, Melocheville, Cascades Point and Isle Perrot, are described. Only at Melocheville is this material quarried at present. It will be used to an increasing extent as our industries develop.

Two possible sources of moulding sand for foundries are described, one about a mile north of Bainsville in Glengarry County, and the other 2½ miles west of Cardinal. Most of the moulding sand used in Ontario and Quebec at present is imported.

BENTONITE

A Species of Clay That Offers a Wide Field for Exploration

A non-metallic mineral which promises to be of considerable importance when it has been further investigated is the clay known as bentonite. It was first discovered in Canada in 1911 by Joseph Keele, ceramic engineer of the Department of Mines, at Camrose, Alberta, and later along the Red Deer river in Alberta and in the Nikola valley in British Columbia.

As described by Mr. Keele, bentonite, when freshly exposed, varies in colour from a light yellow to a light olive green, with a waxy lustre. It is exceedingly fine grained and has a soapy feeling when wet. In water it forms a jelly like mass. The research laboratories of Alberta University are reported to have established the fact that the presence of bentonite is responsible for the gumbo soil of western Canada. As it is capable of absorbing water to the extent of twelve times its bulk, it forms itself into a heavy sticky mass that renders roads almost impassable.

Wide Range of Uses

While its presence in the soil is undoubtedly a serious drawback in regard to transportation, bentonite has many valuable uses, notably as a filler in the manufacture of paper and textiles, in which it has advantages over kaolin, at present largely used. Other suggested uses are: soap making, in which it can [illegible] replace a portion of the soap substance; as a filler in rubber, leather, phonograph records, [illegible] and moulded insulations, as an ingredient in [illegible] and lime plasters, in ceramics, as a water softener and base for massage creams, as a carrier in [illegible] inks and as a substitute for fuller's earth.

The peculiar properties of bentonite have [illegible] further study into its possibilities. And Messrs. E. A. Thompson and A. Sadler, of the Mines Branch of the Department of Mines, are making a more [illegible] investigation into the commercial value of the occurrences already reported and into further uses for the material.—*From "National Resources."*

Book Reviews

IRON ORE — Part 7 — Foreign America — Imperial Mineral Resources Bureau — 4s. 4½d., post free, from H. M. Stationery Office, Imperial House, Kingsway, London, W. C. 2 — 136 pages.

This volume describes concisely the iron ore deposits of both Americas, with the exception of the British dominions and colonies, which were dealt with in Part 3. The chief producing country is, of course, the United States, but Cuba and Brazil have deposits of the first magnitude, in which development has been commenced, and a number of the South American republics have large, though mainly unexplored, supplies of high-grade ore.

The main facts of the iron-ore situation in the United States are so generally known that there is no need of repeating them here. It is noted once more that the high-grade ore of the Lake Superior field will last for only a few years, and that, if this field is to keep its ascendency, commercially successful process of "beneficiation" for low grade ores must be developed. The alternative to this is an enlarged use of the huge deposits of Alabama and the development of scattered deposits throughout the western and northeastern states.

That the growth of the United States steel industry has been developed for, and rests upon, the home market is made clear by the fact that exports of iron and steel are almost a negligible quantity, except during the abnormal war period. The United States does not influence seriously the British export of iron and steel. The former point has a moral for Canadians. We also have a huge territory in Alberta, protected by natural barriers from outside sources or supply, in which it may be possible to effect a successful industrial development alongside the great agricultural development that is now in prospect.

Cuban ore, though cheaply mined and transported, is not as yet used in great quantity. It has been used principally for the manufacture on the United States Atlantic seaboard of iron and steel for export. It is estimated that 1,000 million tons of commercial ore is available.

Mexico has numerous important deposits of iron ore, but only a small production. A development of deposits on the Pacific coast is forecasted.

In the Minas Geraes district of Brazil, superficial examination has determined the largest known reserve of high-grade hematite known in the world. A large part of the several thousand millions of tons available is almost pure oxide of iron, the silica being less than one per cent. and phosphorus and sulphur well below working limits. It is noted though, that the phosphorus is higher than is commonly supposed. The absence of coal has prevented the establishment of any important iron and steel industry. The government of Brazil wishes to encourage the home production of iron and steel, and an attempt to establish an electric smelting plant is under way.

Of the resources in iron ore of the other South American republics, little is known. Nowhere is coal available in sufficient quantity to stimulate a search for iron ore. Deposits have been found in all, particularly in Chile, where the high grade and accessibility of some of the ore has stimulated an attempt to establish an electric steel plant at Santiago.

IRON ORE — Part 8 — Foreign Asia — Imperial Mineral Resources Bureau — 2s. 9½d., post free, from H. M. Stationery Office, Imperial House, Kingsway, London, W. C. 2 — 79 pages.

So far as determined up to the present, Asia is the least bountifully supplied with iron ore of all the continents. The principal known deposits are in China and Manchuria, and important ore-bodies have been located in the Philippine Islands, as well as those in Japan and in Korea, now part of the Japanese Empire.

The various iron ore deposits of China are estimated to contain 1,000 million tons. A large part of this is in the Yang-Tse valley, adjacent to the best coal to be had in eastern Asia, which is controlled by British capital. About one-half the known iron ore supply of China is now controlled by Japanese firms, which have been mainly responsible for the considerable growth of the iron and steel industry of north China during recent years.

The present annual consumption of iron per capita in China is less than 0.0008 ton. In the United States the figure is 0.25 ton. It is expected that the consumption per annum in China will increase rapidly during the next few years. If it were to reach the United States figure per capita, the known ore would last only five years.

Japan has ore reserves totalling 80 million tons. Most of her annual supply is brought from China, where she controls half the reserve available, as mentioned above. In spite of the disabilities due to poverty both of ore and of fuel, Japan is forging ahead as a producer of iron and steel.

In the Philippine Islands, in Sungao province, an area of 40 square miles along the coast contains lateritic ore of good quality, totalling 430 million tons. The nearest market at present in Japan, to which transportation is economically available.

In eastern Siberia, it is known in a vague way that immense deposits of iron ore occur, none of it being developed as yet. Throughout the rest of Asia, iron ore is widely distributed, but little is known of its economic possibilities.

VANADIUM. (1913-1919) — Imperial Mineral Resources Bureau — 7d., post free, from H. M. Stationery Office, Imperial House, Kingsway, London, W. C. 2 — 19 pages.

This little report gives a resumé of the uses, preparation and occurrences of vanadium and its ores, with special attention to occurrences. The ever-increasing use of this rare metal to improve the quality of steel gives it an interest that is in proportion to the growing use of high-grade steels. Though the amount of workable ore available is small, vanadium is required to be added to steel in such minute quantities (0. 2 to 1.5 per cent.) to produce its whole effect that no large annual tonnage is needed. Its action in "scouring" steel by removing nitrogen and oxides as well as its direct alloying action are still the subjects of much study.

The chief, and at present almost the sole, source of commercial supply of vanadium is the Misasagra pat-

ronite deposits near Cerro de Pasco in Peru. The vanadiferous asphalt of these deposits when roasted to eliminate sulphur and carbon contains over 50 per cent. vanadium pentoxide. The next most important source of vanadium is the district in Utah and Colorado in which occur carnotite an ore of radium and vanadium, and roscoelite, the vanadium mica. These deposits, now owned by the Vanadium Corporation of America as are the Peruvian deposits, are not now being operated.

In the British Empire, vanadium ore is widely distributed, but has been found only in relatively unimportant amounts, mainly in conjunction with deposits of lead ore. At Broken Hill in Northern Rhodesia, hand-picking from the lead-zinc ore provides high-grade vanadium ore as a by-product. At Kaffirskraal in South Africa a deposit of vanadinite of fair size has been delineated. In South-West Africa in the Otavi district there has lately been a small but consistent production of mottramite from scattered deposits. In South Australia, carnotite occurs with titaniferous magnetite near Olary. An attempt made to use the deposit as a source of radium has been unsuccessful. The Taranaki iron-sands of New Zealand contain vanadium up to 0.34 per cent.

QUICKSILVER. (1913–1919.)—Imperial Mineral Resources Bureau.—1s. 1½d., post free, from H. M. Stationery Office, Imperial House, Kingsway, London, W. C. 2.—39 pages.

The use of quicksilver (mercury) is at present very limited, though it is one of the oldest known metals, and there is no prospect of the market expanding materially. Most of the world's annual supply (6 to 8 million pounds) comes from Almaden in Spain and Monte Amiata in Italy (formerly in Austria). "It is probable that "either locality, if worked to its full capacity, could "satisfy the world's demand for quicksilver for many "years to come."

The sulphides of mercury, cinnabar and cinnaharite, are the only commercial ores. The ore is roasted and the mercury thus released is distilled. The Almaden ore yields about 6.5 per cent. of the metal. In California, ore as low as 0.1 per cent. in mercury is worked. As a rule, workable ores of mercury occur in regions of Tertiary or recent volcanic activity.

Within the British Empire, Australia and New Zealand alone have produced mercury, and these only in small amount. In Canada the war-time scarcity promoted extensive exploration in an area at the western end of Kamloops Lake, British Columbia. The ore is estimated to contain 1 to 2 per cent. of mercury.

FINAL STATISTICS OF UNITED STATES COAL PRODUCTION IN 1921

Final statistics of production as reported to the United States Geological Survey by the bituminous operators show 415,000,000 net tons in 1921. The Survey's preliminary estimate published January 7, 1922, was 407,000,000 tons. The error in the estimate was thus 2.2 per cent.

Value

The value of the bituminous coal produced in 1921 was reported to be $1,179,000,000 as against $2,109,000,000 in 1920. The average value per ton f. o. b. mines declined from $3.75 in 1920 to $2.89.

Men Employed

Contrary to what might have been expected, the number of employees increased in 1921. There was less work but more men to share it. The total employed at bituminous mines was 663,754,—an increase of 24,000 men. This figure is not the average number of men at work at any one time, including the weeks or months when the mine may have been shut down; it is rather the number of men on the working force of the mine when it was in operation. Since the effect of the business depression upon the demand for coal did not become acute until February or March, the great majority of commercial mines got at least a few weeks operation during the year, and their working forces were thus counted in the total number of employees. By August, 1921, so many mines had closed down that the total number of men drawing wages in one week had fallen to somewhere between 500,000 and 530,000. Examination of the individual returns shows that in many districts the men laid off at small mines found employment at the larger mines. In fact, in some districts, such as Illinois and Pittsburgh, the coal mines employed men discharged by the factories or railroads. In still other districts, notably Maryland, the number employed decreased sharply.

The increase in number of employed was confined to the tonnage workers. The number of day-men decreased in almost every state. The total number of surface employees dropped from 110,000 to 96,000, and of underground day-men from 174,000 to 168,000.

Tons per man per day

This reduction in number of day workers was one cause of the remarkable increase in the output per man per day. In 1920 the average production per man employed per day worked, was 4.00 net tons,—a new record for the bituminous industry. Yet in 1921 the average rose to 4.20 tons, an increase of 5 percent. Other factors contributing to this increase, in addition to the change in proportion of day workers, were the natural tendency to restrict development work in a time of depression, an apparent tendency of the miners to work harder when running time is poor and, most important, a remarkable increase in the percentage of machine mined coal. Average productivity in a machine mine ranges from 20 to 30% above that in a mine where coal is undercut by hand or shot from the solid. Now in 1921 the proportion of coal mined by machines was 65.6% against 59.8% in 1920, and 55.9 in 1918.

Days Worked

Higher productivity per day tended to reduce the number of days worked. The average time worked by all of the bituminous mines was 149 days,—the lowest in the history of the bituminous industry. In the calculation of this average, as in earlier publications of the Geological Survey, the size of each mine is taken into account, and each affects the average in proportion to the number of men it employs.

Examination of the figures by states shows that the business depression was felt in every important coal producing region. Omitting the states of insignificant tonnage, such a California, Georgia, and North Carolina, the lowest number of days worked was 112 in Arkansas and the highest, 196 in Michigan. No important producing state reached the 200 day mark. In Illinois the average was 152 days, in Kentucky, 152, in Pennsylvania, 151; in West Virginia, 149, and in Alabama, 166.

News and Comments

BY ALEXANDER GRAY

Quebec Government Assists Asbestos Industry

In every way opportune was the decision of the Quebec Government to reduce the royalty (really an export tax) upon raw asbestos from 5 to 2½ per cent. The consumer was paying the tax, it is true, which formerly was 2½ per cent. Now the industry will be freer to move ahead and producers contemplating the establishment of fabricating plants will know exactly how they stand. Given this stabilizing influence, it is expected the mills will be enlarged and that manufacturers of asbestos materials will concentrate their enterprise to a greater extent in Quebec. So all's well that ends well.

Sir Mitchelson Meanders

Colossus has none the better of it with Sir Archibald Mitchelson, President of Porcupine Davidson Gold Mines, who is quoted in *The Globe* in this strain:

"The President stated that the outlook was certainly very favorable, and, while he did not claim at this stage that the Davidson Mine was another Hollinger, *he emphasized that it was on the same 'shear zone' formation*".

The italics are mine. Sir Archibald is Colossus and Leander combined. His bracketing is a trifle faulty—or is it his trajectory? These recurring comparisons of the Davidson and the Hollinger "shear zone", as closely akin, are unworthy of Pinner's Hall. Hollinger simply is not in it!

Clouds—and some Silver Linings

Kerr Lake and Temiskaming reflect what is inevitable unless outside investmen's mature with more rapidity. A deficit, after dividends, for Kerr Lake, notwithstanding there is a fi ly surplus, is not what those who know the record of the company care to see. Temiskaming has a substan ial stake in the Blue Diamond Coal venture, and elsewhere, but fruition is apt to be slow of accomplishment. As for the Castle-Threthewey statement, it was encouraging. A gain in the silver in reserve and the milling grade disclosed suggest what is contemplated—a more profitable output, and more of it, when cheaper power is available.

Castle-Trethewey Progressing

On balance the Cas le-Trethewey Mines may be said to have gained 338,000 ounces of silver for an operating loss of $7,693. That much is the excess of expenditure over receipts since the inception of the company in January last, reckoning to June 30. What high-grade was picked and shipped almost defrayed the cost of operations, and as the silver in the reserves now totals 640,000 ounces (at least that was the total in June) the company is fairly comfortable and is in a position to provide a concentrating plant. In the five months during which the company operations maintained, it is evident the management was more concerned with development than about shipments. Until hydro-electric power is available a milling program necessarily cannot be rushed.

Manager Kennedy is informative as to the development results. He points out the strong features and faultings, and is altoge'her optimistic. The details as presented by him are as follows:

40,399 ounces were shipped, being obtained by hand sorting from development rock. The ore shipped averaged 3,778 ounces per ton. Silver on hand amounts to 4,429 ounces, making a total production of 44,828 ounces of high grade, in addition to which 2,000 tons of 20-ounce ore were added to the dump. Ore reserves, which amount to 640,000 ounces, consist of 116,000 ounces in the dump and 524,000 ounces in the workings of Nos. 1 and 2 shafts.

Development work was confined to No. 2 shaft, and was mostly done on the 270-foot level, with generally better results than obtained in either of the upper levels. Seven veins have been opened up and important ore-shoots developed in veins 1, 2 and 3. In vein No. 1 an ore-shoot 75 feet long has been developed from the surface to the 270-foo' level, containing ore of 65 ounces per ton over a stoping width of 42 inches. In vein No. 2 ore has been opened up for 40 feet, assaying 50 ounces per ton over a stoping width of 42 inches. No. 3 vein has been opened up for 50 feet, assaying 50 ounces per ton over a stoping width of 42 inches. These ore bodies have been developed by raises and winzes and found to maintain their values below 'he 270-foot level.

Veins 4, 5 and 6 have persistently produced ore, but no continuous shoots have been developed. The favorable influence of flat-dipping faults paralleling the Keewatin-diabase contact is particularly noticeable below the 163-foot level. Mineralization and fracturing have proved to be more ex'ensive on the 270-foot level and veins 3, 4, 5 and 6 give every promise of becoming producers of high-grade ore.

The value of production is given at $28,000 in the profit and loss statement, this representing 40,000 ounces at 70c. Mine costs stand at $29,371, and administrative and general cos's $6,322, which shows an excess in expenditures of $7,693. The net liability for prior development expenditures undistributed and assumed under purchase agreement is given at $87,124, making a total of $94,818 carried to the balance sheet as deferred charges. Assets, current are $119,332, fixed $403,739; deferred charges $1,535,319, making a 'otal of $2,058,391. Current liabilities are given at $5,391, capital liabilities at $2,000,000, which is capital stock authorized and issued; and $53,000 contingent liabilities owing to former shareholders of Castle Mining Co., and payable only out of net profi's from operations.

METALLURGICAL WORKS IN CANADA

The Mines Branch, Ottawa, has published its annual list of metallurgical works, one of the series of such lists relative to the mining industry, all of which will be issued in due course. The list gives the address, location, products and managers of companies making iron and steel, nickel, copper, lead, tin, zinc, aluminium, antimony and magnesium, as well as silver-cobalt-nickel smelters and refineries and the customs concentrators in Ontario and British Columbia.

New Forge Blower

GIVES NEW MEANING TO TERM "FREE AIR"

BY D. M. McCLEAN, M. E. I. C.

Mine operators will undoubtedly be interested in a new device for blowing forge fires, etc., that recently has been introduced in Canada by The Canadian Ingersoll-Rand Company.

A tiny jet of high pressure air discharges into a bell-mouth nozzle leading to the forge and induces a flow of air from the atmosphere into the nozzle where it mingles with the expanding jet and is propelled into the pipe leading to the forge, providing the proper volume of air at a suitable pressure for the purpose.

In present practice, in mines, boiler shops, blacksmith shops, steel erection, ship yards and certain chemical and other processes, it is customary to take compressed air from the general supply line and throttle it down to a pressure of a few ounces before it reaches the forge tuyere or other point of use. In rivet heating, for example, the ordinary small portable forge will require about 15 cubic feet of free air per minute to blow the fire. To compress this to the initial pressure of 100 lbs. will take the expenditure of approximately 7-1/2 horsepower. In constant daily use, this may mean a yearly cost for air for one forge of at least $300.

With the new blower or air transformer described herewith, the consumption of compressed air from the supply line is less than 2 cubic feet of free air per minute, requiring practically one-third of a horsepower, because the other 43 cubic feet required for the fire is drawn direct from the atmosphere. This represents a saving in dollars and cents per year per forge, other conditions being equal, of not less than $275 per forge. The term "free air" therefore, takes on a new and very important meaning.

Fig 2.

Forge Blower in Use

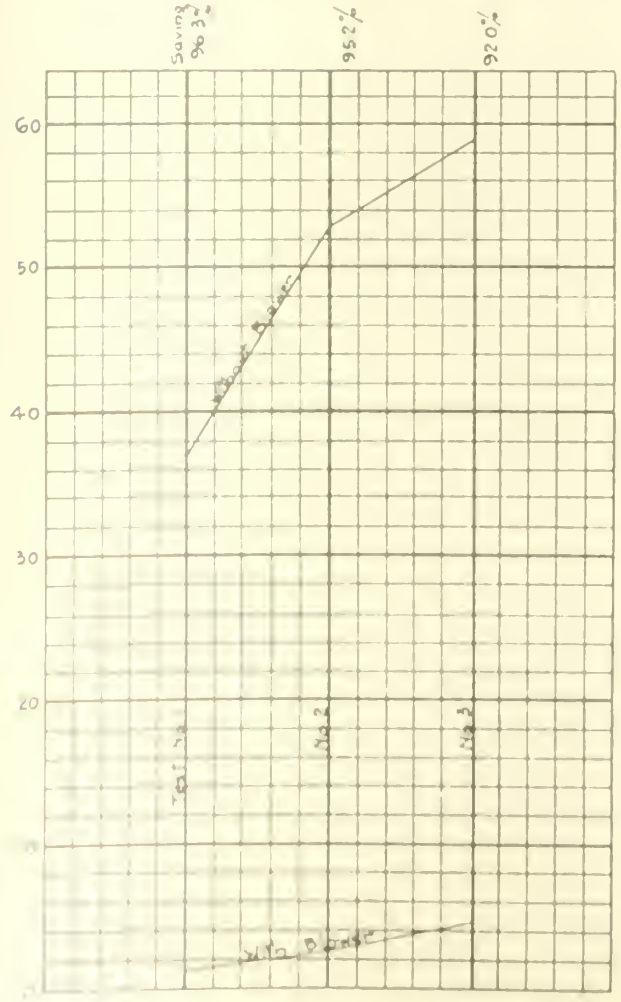


Fig. 1.

The chart, Fig. 1, shows graphically the results of three tests of forges operating with and without the blower. The space between the upper and the lower curves indicates the greatly lessened drain upon the compressed air supply, and the consequent savings are expressed in percentages at the top of the cut.

Test No. 1 was taken with a slow fire, No. 2 with a fairly hot fire and No. 3 with an intense fire. These percentages may also be considered as expressing the efficiency of the blower under the varying conditions, and they emphasize unmistakably the futility of the common practice of compressing the required quantity of air to a pressure of 80 to 100 lbs. and then throttling it down for use at a pressure of a few ounces.

These tests were taken with practically equal valve openings and consequent reduced pressure on the air nozzle. The results of tests with the blower connected to an orifice tank with low pressure and no other outlet to furnish resistance to draft and maximum free output are shown in the table appended.

Fig. 2 shows the general arrangement of the device. V is an ordinary needle valve regulating the flow of

compressed air. In ordinary operation, one quarter of a turn usually provides sufficient air for the work. After passing through the strainer S which retains all dust and dirt which might clog the device, the air reaches the special nozzle N and is discharged into the bell-mouth B which is connected to the forge.

The bell-mouth is cast solid with the strainer chamber, and ample space is provide for the access of free air as it is drawn into the bell-mouth. The strainer may easily be blown out to clean it by removing the plug at the bottom of the chamber. Home-made blowers resembling this device have often been made up from pipe fittings, but cannot attain anything like the results reached by this specially designed appliance, proportionated and adjusted for the best possible results. The standard blower of this type is designed to deliver the air at a pressure of 4 inches of water, but higher pressures may be reached by the use of specially designed jet nozzles.

In the tests mentioned above the actual air pressure in the screen chamber below the needle valve was taken. This is the same as the working pressure on the jet nozzle. The cost of this device is such a small fraction of the saving it ensures that it may be expected to have quite a wide application in its particular field.

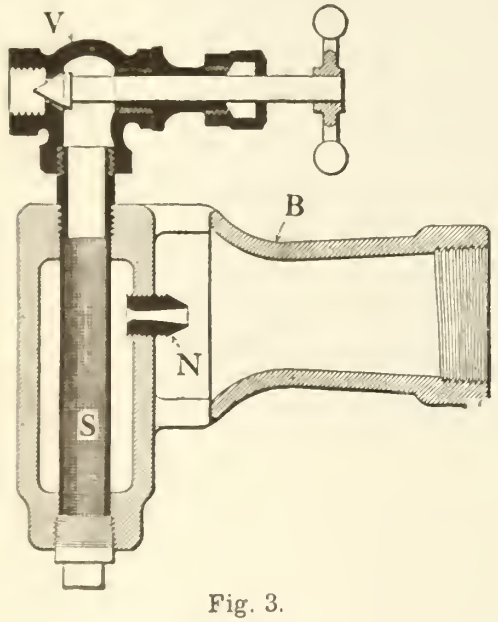


Fig. 3.

TEST No. 4.

RESULT OF TESTS OF NEW JERSEY BLOWER ON WIND BOX USING 1″ ORIFICE

Working Pressure on Jet Nozzle lbs. per sq. inch	High Pressure Air Used C. F. A. per minute.	Low Pressure in inches of water.	Free Air delivered C. F. M.	% of Air Induced
5	.96	.31	12.15	92
10	1.36	.72	18.5	92.8
15	1.67	1.00	21.8	92.3
20	1.93	1.25	24.4	92.2
30	2.52	1.84	29.6	91.5
40	3.07	2.38	33.6	90.8
50	3.64	2.87	36.9	90.2
60	4.20	3.14	38.6	89.2
70	4.75	3.61	41.4	88.7
80	5.3	4.12	44.2	88.
90	5.85	4.57	46.5	87.5
100	6.45	5.05	49.0	87.

With a 1″ Orifice the New Jersey Blower develops pressure or draft in excess of ordinary requirements for blowing forges. When pressure or resistance against which the Blower delivers is increased, this is at the expense of volume and also reduces the percentage of free air induced. The normal outlet of the Blower is 1¼″ giving a greater volume at a little lower draft pressure.

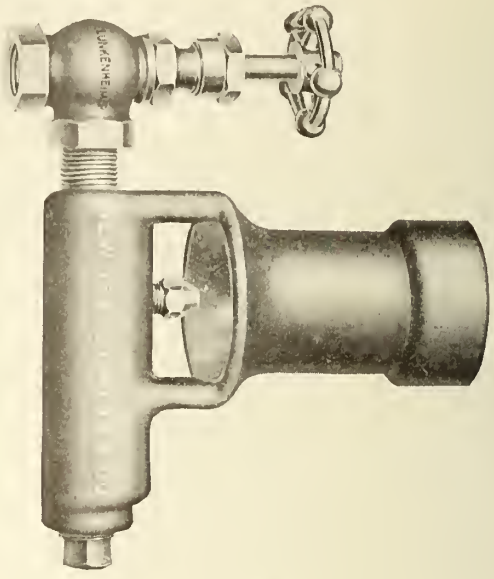


Fig. 4.

TEST No. 5.

RESULTS OF TESTS OF NEW JERSEY BLOWER IN WIND BOX USING 1¼″ ORIFICE

Working Pressure on Jet Nozzle lbs. per sq. inch.	High Pressure Air Used C. F. A. Per min.	Low Pressure in inches of water	Free Air delivered C. F. M.	% of Air Induced
5	.96	.29	18.3	94.8
10	1.36	.48	23.6	94.5
15	1.67	.67	28.0	94.0
20	1.93	.88	31.9	94.0
30	2.52	1.29	38.6	93.5
40	3.07	1.64	43.5	93.0
50	3.64	1.95	47.5	92.4
60	4.20	2.18	50.5	91.7
70	4.75	2.50	54.0	91.4
80	5.3	2.80	57.0	90.6
90	5.85	2.95	58.5	90.0
100	6.45	3.25	61.4	89.5

The resistance to flow or draft pressure required in an ordinary forge is somewhat less than for a nozzle of this size. With less resistance the flow is greater in volume. The working pressure on the jet is controlled by the needle valve and can be anything up to the full line pressure. In forge blowing the working pressure required is usually from 15 pounds and draft pressures of ½″ to 1″.

Copper-nickel alloy money, being of a yellowish colour and liable to earnish, is not diffieult to counterfeit; but coins of pure niekel metal are not subjeet to tarnish, and being of a bright white lustre, are practically proof against successful counterfeitures. Moreover, while copper-nickel is a comparatively soft alloy and consequently easy to work, pure Nickel is very hard, thereby offering almost insuperable diffieulty to successful counterfeiture, and in addition, pure niekel being subject to magnetic attraction, sparious coins composed of alloys can be immediately detected.

Steam From Electricity

By A. R. R. JONES

(Editor *Journal of Commerce*)

The production of steam by electricity seems, at first sight, a rather striking example of whimsical and ingenious paradox. But the electric steam generator has already achieved a certain, and is destined, one cannot doubt, to achieve a much wider, sphere of usefulness in its application of electric energy and its conversion to heat energy. For analysis of present conditions of energy production and conversion, accentuated by the recent, and, indeed, still continuing, dislocation of all kinds of productive activities, has shown that the electric steam generator has a very valuable place where hydro electric power is available which otherwise would be suffered to be idle or to go to waste.

It is not claimed that electricity can be produced to compete with coal for the making of steam at normal times and under conditions where electric power is sold on a kilowatt hour basis. But in a number of European countries possessing hydro electric power, the scarcity and high price of fuel, in recent years, have combined to favor the development and use of various methods, such as the electric steam generator, of generating steam by electricity. According to a very interesting paper on this subject by Mr. F. T. Kaelin, M.E.I.C., chief engineer to the Shawinigan Water and Power Company, read early this year before a joint meeting of the Montreal section of the Society of Chemical Industry, the Engineering Institute of Canada and the Canadian Institute of Mining and Metallurgy, there are more than three hundred installations known to exist in Italy, Switzerland, Sweden and France. In Canada and the United States a small number of generators have been in use for a short time.

Among the paper companies, and other industrial concerns, in the St. Maurice Valley district there have been quite a few installations of these appliances for the electrical generation of steam. The Laurentide Company has one of the largest installations thus far, and the Shawinigan Water and Power Company and the Laurentide Power Company must be benefiting largely by reason of their being able to dispose of their off peak load in this manner. For not only is the new apparatus very valuable to paper and other industrial companies by rendering them independent of coal in emergencies—in fact, with some industrial companies in the St. Maurice Valley, coal is now said to be playing quite a secondary part in the turning of wheels—but it is also giving power companies a market for their surplus current at a figure sufficient at least to pay operating and carrying charges.

Power companies have had cause, in these recent times of industrial depression, to consider the problem of the disposal of their surplus power. This power they can obviously afford to sell cheaper while there is no other market for it, in preference to allowing it to run to waste, but it must yet be emphasized that they could not afford to develop hydro electric power for the main purpose of generating steam in competition with coal. Thus the problem that has been confronting them has been to find a use for their surplus power, which would not require any expensive installation, new machinery or additional apparatus. And a solution, or part solution, of this problem has unquestionably been found in the turning of electric power into heat in the form of steam which is used very largely in many industries, and especially in the pulp and paper industry.

Some of the installations in operation today may be considered as temporary, and as, in fact, owing their existence to exceptional industrial and other conditions. At the same time, there can be little doubt that there are many cases where the electric steam generator has made for itself a valuable place and one of permanent usefulness at such times as there is power available from the power companies. In the paper from which we have quoted, Mr. Kaelin suggests that it may even be feasible to use only night power by means of close cooperation of the power company with the power user, and in virtue of the fact that the starting and stopping of electric steam generators take only a few minutes. These are points which, as he says, render the steam generator a very flexible apparatus and make it very useful for the conversion of electric energy, at any time, at short notice and at extremely low cost, into valuable heat energy.

In the electric steam generators all electric energy is converted into heat energy, and the electric current passes through a resistance, either of metal or formed by the water to be evaporated. They have been built during the last ten years in capacities up to 1,000 kilowatt, and only within the last two years sizes of 2,000 kilowatt and more have made their appearance. Steam generators can be divided, as appears from what we have just said as to the passage of the electric current, into two main and distinct classes: First, generators in which the electric current passes through a combination of metallic resistors; and secondly, generators in which the water itself forms the electric resistance. In his paper above referred to, Mr. Kaelin emphasizes the outstanding advantages of the water resistance type, as compared with other types, as consisting in simplicity of construction, compactness, easy control, and its very low cost per kilowatt capacity which is very often the determining factor, especially for temporary installations, or where that rate power is consumed to flatten the load factor of an industrial plant.

Among the other advantages of the electric steam generator over the usual coal fired boiler, Mr. Kaelin mentions the fact that any interruption to feed water supply simply means the shutting down of the generator and does not in

troduce any danger. The steam generator is equipped with the usual steam safety valves, and can, in addition, be supplied with an automatic blow-off valve which discharges the water and thereby shuts down the generator, should the pressure go beyond a fixed limit. Other safety devices consist in relay protection of the electric circuit in case of short circuit, unbalancing or ground on the electric system, and a trip for the automatic oil switch, which will interrupt power and therefore the steam supply. Accordingly, the operation of the steam generator may be said to be as safe as, if not safer than, that of the ordinary boiler, and the insurance companies have no hesitation in accepting insurance on the apparatus in the usual manner.

What we have said will suffice to show something of the importance to industry of the electric steam generator and its possibilities. In the near future we shall publish a special article going into the whole subject in considerable detail.

POSITIONS VACANT

The Secretary of the Civil Service Commission, Ottawa has given notice of the appointment of the following. Particulars and forms for application can be had from him.

4606. A Junior Chemist, Ore Dressing and Metallurgy Division, Department of Mines, Ottawa, Ontario, at a salary of $1,680 per annum, which will be increased upon recommendation for efficient service at the rate of $120 per annum, until a maximum of $2,040 has been reached. This salary will be supplemented by whatever bonus may be provided by law.

4607. An Inspector of Petroleum and Natural Gas Operations, Mining Lands and Yukon Branch, Department of the Interior, Calgary, Alta., at an initial salary of $2,100 per annum which will be increased upon recommendation for efficient service at the rate of $120 per annum, until a maximum of $2,580 has been reached. This salary will be supplemented by whatever bonus may be provided by law.

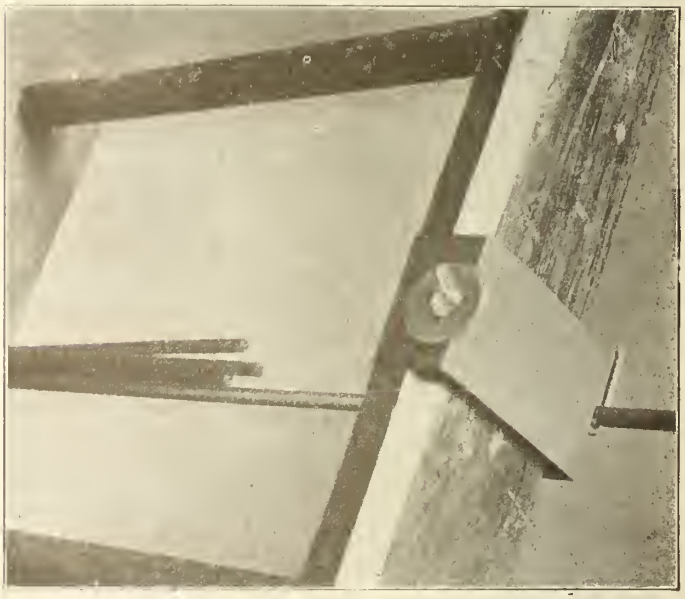
NEW MAP

The Department of Mines, Toronto, has published a little map on a scale of 4 miles to an inch, of the Watabeag Lake area, which includes 15 townships extending westward from Sesekinika and Ramore stations on the T. and N. O. Ry. to Michie, Timmins and Sheraton Townships. It outlines the geology of this area, which is, briefly, two larges areas of Keewatin rocks intruded by Algoman granite, with an area of Cobalt sedimentarics near the railway. A large part of the area is heavily drift-covered. This map will be followed in due course by one on a larger scale geologically coloured and showing greater detail, to accompany Mr. D. G. H. Wright's report on the district. The eastern tier of townships has been mapped previously, but has been included in this key map for the purpose of indicating the position of the area relative to the railway. Copies of the map are available on application to the Department of Mines, Toronto, or to the several Recording offices.

A LADDER VISE ATTACHMENT

For want of a better name the attachment shown in the photo is called a ladder vise, because it enables work to be tightened to the side of a ladder in a manner similar to a bench vise.

Often it is a difficult operation to drag out a particular length of steel from a rack running along the storeroom wall, especially if the size required lies near the bottom of a pile or is some distance from the floor, as most of the smaller diameters usually are. When the whole length of the piece is required there is no alternative, of course, but to pull it all out. It is when only a certain length is required that the usefulness of the device illustrated is shown, for by its use the stock can be sawed off without removal from the rack.



To make the vise, a piece of sheet-iron is cut and bent to fit the side of ladder, so that it will slide up and down, the ends being bent inwards but left short enough to clear the rungs. Next a hole is drilled or punched for a rod which is bent at right angles at one end of the iron, after which the wing nut is tightened together with a washer rather large in proportion to the nut, forming the means for tightening the vise in place.

When it is desired to saw a length of rod, the ladder is placed in a convenient position and the particular rod wanted pulled out from the rest a distance a little longer than the length required. The vise is then slid to position and the work inserted between the bent rod and the iron, after which the wing nut is tightened and the piece sawed off in the usual manner with a hack-saw.

Easy to make and simple to operate, this attachment holds a rod securely while being sawed, rapid adjustment being effected by the single nut tightening the work in the vise and the vise to the ladder at the same time.—Harry Moore, Montreal.

The bituminous sand beds intersected for a distance of 73 miles by the Athabaska River are 150 to 200 feet thick and are estimated to cover an extent of 10,000 square miles. These beds comprise, therefore, not only the largest known deposits of asphaltic material, but one of the world's largest accumulations of carbonaceous material.

The Mining Districts

BY THE JOURNAL'S CORRESPONDENTS

NORTHERN ONTARIO

(Special Correspondence)

EXPRESS RATES ON BULLION.—Partly due to the efforts of the Ontario Mining Association, the Express Companies have granted a reduction in the carrying charges for gold and silver bullion. While the reduction on gold bullion is comparatively small, a substantial saving has been effected on silver bullion. The price from Cobalt together St. John or Halifax will be $5.60 per $1,000, as compared with a rate of $7.90 now in force. On gold bullion from Porcupine and Swastika to Denver, Colorado, a reduction of 60 cents has been made, the new rates being $5.45 and $5.15 per $1,000. To Ottawa the new rates will be $2.10 and $1.80, a reduction of 25 cents and 20 cents respectively.

HIGH GRADING.—Further arrests have been made in connection with the effort to stamp out high-grading in the Northern Ontario gold camps. A man named E. Belanger from South Porcupine was caught in North Bay and was found to have in his possession 65 pounds of high grade ore, estimated to be worth $100 per pound. Several Italians in Porcupine, employees of the Dome, were also arrested in connection with this lot. Police officials claim that three separate rings have been operating, and police activities to date have resulted in the arrest of members from each of those gangs. It is understood that further arrests are liable to follow in the near future.

KEELEY.—It is stated that the Keeley has found one of the richest silver veins ever encountered in Northern Ontario. The discovery was made on the 4th level of the Woods contact and on plunge the ore is 12 inches in width, and of an extremely high grade. The company is maintaining a large production and in September the output was [illegible].

NIPISSING.—During the month of September the Nipissing mined ore estimated as value of $194,000 and shipped bullion and products of an estimated net value of $231,000. The low-grade mill treated 6,834 tons and the high grade mill 201 tons while the refinery shipped [illegible] ounces of bullion.

MCKINLEY DARRAGH.—During the month of September the McKinley Darragh produced 52,000 ounces, some of which was obtained from the vein recently discovered. The vein on this property is of substantial width, but [illegible].

O'BRIEN.—The O'Brien group lost its mill by fire a couple of months ago but concluded a deal for the purchase of the Castle mill at a price understood to be $75,000. The Beaver Company has a bond issue of $150,000 on which the interest was in default and it is understood that an offer was made to the court under authority [illegible].

[illegible].—The Consolidated lost the mining plant on the [illegible] was destroyed in the big fire. It is also said that the Consolidated negotiations for the Beaver will soon be concluded. The Beaver has some very promising territory on its lower contact, but has not sufficient means to undertake a development.

CASTLE.—The report of the four months ending June 30th, shows a production of 44,000 ounces, valued at $28,000, and expenditure of $35,700, leaving a deficit of $7,700. The report states, however, that during this period an additional 338,000 ounces of silver was put in sight, and ore reserves now stand at 640,000 ounces. Drifting on the 270-foot level has shown the best result of any part of the mine. The financial statement shows current assets of $119,332 and current liabilities of only $5,391. A further sum of $87,124, representing liabilities for development expenditures which have not been distributed, makes a total of $91,818 on the debit side of the Balance Sheet.

TRETHEWEY.—The annual report of the Trethewey for the year ending June 30th shows that the Castle has assumed the old Trethewey's liabilities of $87,124. The only asset that the Trethewey now has is 400,000 shares of Castle stock. Expenditures for the year were $12,900, with no revenue.

EVERETT.—Underground development work has been started on the Everett, which adjoins the Castle. Operations are being conducted from the original Castle shaft, which was sunk close to the Everett boundary, and crosscutting has been started on the 175 foot level.

KIRKLAND MILLS IDLE.—Operations in the Kirkland mines are still confined to pumping, and it will probably be some time early in November before sufficient power will be available to permit the mines and mills resuming.

REBUILDING POWER LINES.—A few days after the big fire that destroyed the transmission line of the Northern Ontario Light and Power Company, it was thought that a temporary line could be made which would permit power being turned on in two weeks. The damage, however, proved to be greater than originally estimated, and the power company decided to make a permanent job of replacing the burned section instead of trying to get power over a temporary line.

POWER THROUGHOUT WINTER.—Due to the extremely dry season, operators have been somewhat doubtful about the supply of power during the winter. The main supply is generated at the Matabitchewan plant, but this year the company has installed another storage dam on Rabbit Lake and feels that there will be sufficient water to carry on operations throughout the winter without any curtailment of power.

TOUGH OAKES.—A recent official statement of the development work on the Tough Oakes reports that 34 feet of drifting has been done on the new vein found on the 4th level, and that the average assay is $11.00 over a width of 60 inches. No information has been given out regarding the milling results but the Ontario Department of Mines report for the first six months of the present year shows that the Tough Oakes ore averaged less than $5.00 per ton. The mill had only been started a short while, however, and it is possible that during the turning up process low grade ore was [illegible].

LEBEL LOOT.—The Lebel Loot is negotiating for the underwriting of a block of treasury stock and in the meantime work on the property has been stopped.

Continental.—The recent offering of 250,000 shares of Continental Mines Limited has been oversubscribed. This company owns 27 claims in the Kirkland Lake district and will now have $1,000,000 in the Treasury, which will be ample to finance the proposed plans which the company has under consideration.

Pancake Lake.—Development work on the new find of the Pancake Lake property of the Crown Reserve continues to give good results. On the adjoining property the Associated Gold Fields has just completed a 1000-foot diamond drill hole, but no information is available regarding the results obtained.

West Dome Lake.—Notices have been sent to shareholders regarding the completion of the Consolidated West Dome Lake merger, and they are asked to turn in their shares to the liquidator in order to permit of the distribution of the stock on the basis of one share for each two shares of the old stock. Dome Lake officials have also asked the shareholders to contribute 1 cent per share to pay off the $30,000 debt owing to the Hudson Bay Mines. The new merger has a capital of $5,000,000, of which 1,750,000 shares are in the treasury. This has been underwritten on a graduated scale from 20 to 60 cents per share, and will net the company approximately 40 cents a share.

Dome.—An unsually rich discovery has been reported on the 7th level of the Dome, and it is stated that high grade ore is being bagged and shipped direct to the refinery. The company continues to maintain a high production and the October output will be approximately that of September, which amounted to $423,000.

Clifton.—The Clifton has its small mill in shape to commence operations, but it is understood that power will not be available until there have been heavy rains or until the Sturgeon Falls plant is completed.

McIntyre.—The report of the McIntyre for the three months ending September 30th shows gross earnings of $585,868 and net earnings, before allowance for plant depreciation, of $268,035. Production for the qnarter is considerably in excess of that for the corresponding quarter of the previous year, and is considered particularly gratifying in view of the fact that very little benefit was obtained from the new mill additions. The full benefit will be reflected in the quarter ending December 31st.

Davidson.—A shareholders meeting of the Porcupine-Davidson was recently held in London, England, at which it was announced that within eighteen months it was expected to have the 500-ton mill built and the new 1000-foot shaft completed. The estimated expenditure for this is £100,000, and an agreement has been entered into whereby the money will be loaned for a period of two years with interest at 5 per cent.

NOVA SCOTIA

Steel Plant Output.—With a working force of 3050 men, the ingot-output of the Sydney steel works equals the output of the years when the number of men employed ran close to 3800. The gain is, however, not altogether due to better management. The kind of material being turned out accounts for a small part of it. A record day last week show 1,101 tons, the highest in the whole 22 years of operation.

Galvanizing Plant.—A new galvanizing unit is to be built at the Sydney Steel plant to take the place of the one now running. It will have a daily output of 80 tons, being twice the capacity of the present mill. The demand for wire and wire products has increased very much of late and bids fair to out-run the supply, but the new unit will take care of all the needs of the wire trade.

Rail Order.—The order for 25,000 tons of 100-pound steel rails for delivery next spring placed with the British Empire Steel Corporation by the Grand Trunk Railway, will keep the rail mill busy throughout the winter, present orders being sufficient for brisk business up to Christmas.

Electric Undercutter.—The Sullivan electric undercutting machine is being used in No. 24 colliery, a comparatively new mine. This is the first electric undercutter in the Glace Bay district and its work will be watched with interest by all mining men, as it marks a departure in cutting coal in Glace Bay collieries. The Dominion Coal Company plans to cut all coal in the future by electric power and has been preparing for the change ever since the British Empire Steel Corporation took practical form.

BRITISH COLUMBIA

Mackenzie River.—Professor M. Y. Williams of the University of British Columbia returned recently from a trip to the McKenzie River basin where he was in charge of a geological survey party. He left Fort Norman on September 4th and says that the only persons he saw there were the employees of the Imperial Oil Company and some Indians. The white posts of the claims staker were spread over the country for miles, tombstones of a vanished hope. Practically all these claims have been abandoned as the high rental demanded by the Government made it impracticable for the lessees to retain them. Even the Fort Norman Syndicate's well, which struck gas at 1500 ft.—"the only well put down by an outside company"—has been abandoned.

"Take the case of a man who staked the limit," said Professor Williams "a limit of four square miles. At a yearly rental of 50 cents an acre this would cost him annually $1200. There were many who paid this amount to hold their claims for a year, believing that within a twelve month they could dispose of them at a huge profit. Their claims have gone the way of those who were satisfied with smaller holdings."

The Imperial Oil Company alone continues the quest, but is not hurrying about it. The Discovery well, the first gusher to be brought in, has been deepened and a greater flow of oil has been struck, but the total flow is estimated at only 75 barrels a day. The Company is still working at the other four weels which were started last year, but nothing more has been found. As Professor Williams was coming up the McKenzie toward home he met two new crews going in to replace the oil drillers who were leaving the country. These crews were picked men from the Petrolea Oil Field in charge of Angus Sutherland, a veteran driller. They will sacrifice the young months of winter in order to be early at work next spring, for the frozen lakes and rivers do not permit entry through the country until June.

In his comments on the Mineral Resources of the North, Professor William refers to the Nathinna River, which is on the direct route to the Yukon. He states that this river and the district contignous to it offers a splendid field for exploration. It is supposed to conceal in its bed enough gold to pay off the national debt. A large number of prospectors went in to this section

this year. Guarding the mouth of the river like a silent, sentinel stands the Nathlinina Butte, 4,000 feet above the stream, which is bordered by mountains for its full length.

Cedar Creek.—The Del Ecuador Mines Co., Limited holders of four placer gold leases on Cedar Creek, Cariboo, B. C., valued at $100,000, has gone into voluntary liquidation to meet creditors claims of $17,000. The Company was incorporated in 1897 and with the recent revival of activity in the Cedar Creek District resumed operations this year.

Mayo.—Captain George Black, M. P. has returned after spending the summer in the Yukon Territory. Referring to the Mayo Camp he states that the Keno Hill property shipped 3,100 tons of high grade ore to the Selby Smelter at San Francisco during the summer. The experiment of transporting ore from the mine to river boats by tractor trucks, which carry from 25 to 30 tons a load, is proving satisfactory. Captain Black also announced that important strikes have been made in the Beaver Creek district, about 50 miles from Mayo. Not much was known about them yet but there were indications that the whole district was richly mineralized and several outfits had been taken in to continue work all winter. He said that next summer would see both the Keno Hill and Alaska Treadwell Co. installing reduction plants for the treatment of lowgrade ore. At present only ore running from $100 a ton up was being shipped and great dumps of the lower grade had been accumulating. Many of the placer companies, which have not been operating since early in the war, are planning to resume work next year. He expects to see a remarkable recovery on the part of the Yukon in point of mineral production.

Portland Canal.—The directors and shareholders of the American Mining & Milling Co. who recently visited their property on Fish Creek, Portland Canal District, appear thoroughly satisfied with the showings made and the progress of development. W. R. Tonkin, who is in charge of the work, took his visitors over the camp and Mr. Grant Mahood, President, afterwards stated that it was the intention immediately to make surveys for an aerial tramway to be built in the spring. This will be from a mile to a mile and a quarter in length, running from the mine to the Salmon River wagon road. Plans also have been made for the installation of a concentration plant capable of handling 100 tons of ore a day. Brothers & Company, of New York, are reported to have undertaken the financing of work necessary to the development of the Daly Alaska group of mineral claims, Portland Canal.

A [illegible] grade ore is reported as having been made on the Alaska Premier, samples of the ore giving returns of [illegible] gold and 26.0 ozs. in silver.

A [illegible] vein on the Big Missouri. It [illegible] ft. of good ore. The intention is to [illegible] 200 or 250 ft. A blower is being used for ventilation.

The Consolidated Western Fuel Corporation dropped to E. J. [illegible] and associates of Seattle, Washington. The [illegible] situated on the east side of the Portland Canal [illegible] of some 3,000 or 3,500 ft. There are [illegible] and dyke leads, all of which have been [illegible] and good values are showing in gold and silver.

Trail.—The receipts at the Trail Smelter, Consolidated Mining & Smelting Co. for the first seven days of October were 8776 tons. Among the contributors were the Bosun, Sandon, B. C., 18 tons; Knob Hill, Republic Hill, Republic, 118; Lanark, Lawrie, 23; Metallic group, Silverton 15; Noble Five, Sandon, 87; Northport Smelter, 54; Ottawa, Slocan City, 15; Paradise, Lake Windermere, 41; Quilp, Republic 160; Silversmith, Sandon, 175; Silver Hoard, insworth, 38; Surprise , Republic, 105; Standard, Silverton, 183; Utica, Adamant 47; Van Roi, Silverton 25, and Neosho, Ainsworth 11. The latter is the first shipment made from this property. The Company properties have shipped so far this year to the corporation smelter 304,718 tons of ore which is an exceptionally high mark.

Oil Wells In Alberta.—J. R. Court, of London, Eng. Director of the Spartan Oil Co. Ltd. is in Western Canada investigating conditions in the Coutts and Wainwright oil fields. Mr. Court is said to represent British financiers and to be commissioned to obtain for them the facts regarding existing oil condition in the Province of Alberta. "Drilling in the Coutts properties of the Spartan Company will start immediately", Mr. Court stated. "We are drilling one well in Montana and also expect to commence operations quite extensively on the Canadian side. We have just shipped 7 carloads of equipment and casing to Coutts, Alberta, in order that an early start may be made in the exploration of a field approximately 10,000 acres, which the company has under option."

Smithers.—J. F. Duthie, of J. F. Duthie & Company, Seattle, Washington states that a mining plant consisting of compressors, drills etc. will be shipped to Smithers, B. C. to facilitate further development on the Aldrich, Henderson, and White Swan groups of silver-lead claims, Hudson Bay Mountain. He states that surveyors are now working on the mountain to permit the drawing up of plans for the creation of an aerial tramway from the mine to the Smithers Railway Depot. One hundred tons of silver-lead ore is ready and will be shipped on the settlement of the freight rates question.

Vancouver Meeting C. I. M. & M. The annual meeting of the British Columbia Division of the Canadian Institute of Mining and Metallurgy will be held at Vancouver, B. C. starting November 15th next. There will be the usual sessions and the arrangements thus far made assure a programme of unusual interest. Plans have been made to enable delegates to visit some of the operating coal mines of Vancouver Island.

B. C. Coal in September.—Although the collieries of British Columbia have not been working at the same high pressure recently as was the case in August, there was little lost time in the month of September, the total production for that period being 267,355 tons. The Herewood Mine, Canadian Western Fuel Corporation, lost two days but, apart from this, there was no evidence of slackness. There was, however, a distinct slowing up on the Island and in the Nicolas Princeton fields. As for the Crow's Nest, the returns show that it has not taken long for the operators to get back almost to normal in point of output.

The Canadian Western Fuel Corporation dropped from 85,282 tons in August to [illegible] in September; the Canadian Collieries from 18,118 to 39,108 at Cassidy, 21,044 to 18,823 at Extension; and 7,117 to [illegible] at South Wellington; the Granby Companies from [illegible] to 21,115; and the Nanoose Wellington from 10,31[illegible]

to 2,851. The same tendency is shown by statistics relating to the Nicolas Princeton Collieries, the Middlesboro Colliery from 1,540 tons to 7,135; the Fleming Coal Co. from 1,676 to 3,894, and the Coalmont from 18,059 to 14,599.

The rapidity with which the Crow's Nest Pass Collieries have got back on their feet after the strike lasting from April to September is remarkable. The Coal Creek Mines in March last produced 56,780 tons and last month their output was 36,997 tons. There were mined at Michel last March 33,240 tons and the figures for September are 31,228. The Corbin Coal and Coke Co. has 6,703 tons to its credit for September. Last March it was 7,430 tons. This mine, however, was not entirely closed down over the whole period of the strike, having an output of 3,554 tons in April and 179 tons in May.

A DOUBLE DRUM COMPRESSED AIR HOIST

A portable hoist, designed primarily for more convenient, economical and effective use in hauling ore scrapers or "slushing" than can be secured with the single drum hoist of this type, is announced by the Sullivan Machinery Company, Chicago, Ills., and is known as Type "HDA." In the double drum hoist, the "Turbinair" motor, in its casing, is supported on a central standard with a broad frame or foot, and supplies power to the two hoisting drums, each 10 3-4 inches in diameter by 5 1-8 inch face, which enclose the motor.

The capacity of this hoist is the same as that of the single drum type. Either drum is capable of lifting 2,000 lb. dead weight vertically, with 75 lb. of air pressure at a speed of 110 ft. per minute. This hoist has the same economy of air consumption as the single drum machine. Sufficient air can be supplied the machine through a 3-4 inch hose line to develop the machine's rating of 6 1-2 H. P.

In "slushing" work the live or hauling rope is attached to one drum and the tail rope or return rope to the other drum. By means of a suitably placed snatch block or arrangement of sheaves, the tail rope is paid off the second drum as the load comes in on the first, and when the scraper has been dumped the process is reversed, the clutch being thrown out on the live rope drum and in on the tail rope drum to haul the scraper back to the loading point.

Advertisements other than "Employment Wanted" or "Employees Wanted" will be inserted in this department at the rate of 20 cents per agate line (14 agate lines make one inch). $2.80 per inch, each insertion, payable in advance. Space measured from rule to rule. When four or more consecutive insertions of the same advertisement are ordered a discount of 25 per cent. will be allowed.

Advertisements of "Wanted Employment" or "Wanted Employees" will be inserted at the rate of two cents a word, net. Cash must accompany order. If box number is used, enclosed ten cents extra for postage in forwarding replies. Minimum charge 50 cents.

CHEMIST, experienced in blast furnace and steel plant work, ores etc., desires position. References. Address Box 521, Canadian Mining Journal, Gardenvale, Que.

INDEX TO MINE AND MILL SUPPLIES

Addresses of advertisers, whose names appear in the following classified index, may be found upon reference to their advertisements. An alphabetical index to advertisers will be found on the page facing the inside back cover. The following regulations apply to all advertisers:—One-eighth page, every issue, three headings; one-quarter page, every issue, six headings; one half page, every issue, twelve headings; full page, every issue, twenty-four headings.

Buyers who are unable to find in the classification heregiven such machinery or supplies as they desire are invited to write Service Dept., Canadian Mining Journal, Gardenvale, Que., who can in all probability, refer them to proper sources.

Canadian Mead-Morrison Co

Acetylene Gas:
Fres-O-Lite Co of Canada, Ltd

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Canadian Ingersoll-Rand Co., Ltd.
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Canadian Ingersoll-Rand Co., Ltd.
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Mine & Smelter Supply.

Ball Mill Feeders:
Engineering Equipment Co., Ltd.
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Mine & Smelter Supply.

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Canadian Link-Belt Co., Ltd.
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Belting — Silent Chain:
Canadian Link-Belt Co., Ltd.
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Jones & Glassco (Regd.).

Belting (Conveyor):
Gutta Percha & Rubber, Ltd.
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Hendrick Manufacturing Co.
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Diamond Drill Carbon Co.

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Peacock Bros., Ltd.

EDITORIAL

Every Canadian must wish the utmost success to the efforts now being made to develop the gold mining industry in the Dominion, but not by the plan of the modern miner who, unlike the ancient miner, begins by opening a broker's office on a leading thoroughfare instead of a tunnel in a mineralized hillside.—A. R. Selwyn —1897.

WILL THE COAL MINERS HOLD UP THE PUBLIC?

The president of district eighteen, United Mine Workers of America, is quoted in a press despatch as announcing that at the expiry of their agreement with the operators on March 31st next, they will demand not only the continuance of the present rates of pay, but a six hour day and a five day week. Thus do the coal miners of Alberta and eastern British Columbia throw down the gage of battle before their employers, the coal operators. They do this openly and deliberately, with a full knowledge of what their challenge involves. There are rumours of a similar move to be made by the coal miners of the United States at their conferences to be held soon. They too are ready to renew a fight of which they have won the first round.

It is probable that none of these unions of coal miners realize clearly a fact that is as yet only dimly seen by the general public, and in fact has not yet become even dimly visible to the vast majority. The coal miners have determined deliberately to constitute themselves a privileged class on this continent, and demand it as a right that they be paid for their labour at a rate quite out of proportion to the service they render the whole people of the continent. The terms under which they propose to labour in the mines would afford them a living at the expense of less effort than will support the average man and his family under the conditions at present prevailing in Canada and the United States. They implicitly propose that other classes of labour and professional men shall expend the remainder of effort necessary to provide them (the coal miners) with a comfortable living. Their present demands mean that the rest of the community of all callings, are to work longer hours that the miners may have two days of rest in seven and an exceptionally short period of labour on the other five days. The coal miners propose a measure that will turn them into the human leeches they profess to deplore, against whose supposed domination, as capitalists, the present ultimatum is directed.

Will the public allow itself to be held up, as was done recently when the coal operators acceded to the demands of the miners? Will the case of the public remain virtually unrepresented when the other two parties to the dispute align their arguments next spring? Shall we, the owners of the natural resource that is the physical basis of the dispute, allow our agents, the operators and the miners, to decide their differences without reference to our undoubted and inalienable rights? Put in this light, the conclusion is obvious.

Unfortunately the general public, which alone can provide and enforce a just decision in this triangular dispute, is not as yet sufficiently aware of its responsibility to act in the decided way the occasion requires. There are glimmerings of interest in the dispute in certain quarters, but the issue is as yet grasped clearly by only a very few. It is incumbent upon these few to act, and to act promptly. The public press is the principal and most effective means of educating the public rapidly and effectively in such a case. We hope that publicists and the press will take hold of this most important question and employ all the means at their command to prepare the public's brief. Only thus will a purely selfish decision be avoided. Only thus will British justice be upheld in its high place in our land.

CANADIAN SOAPSTONE PRODUCTION

There is in Canada an increasing annual consumption of blocks or bricks of soapstone, which are used to line the "smelting" furnaces of sulphate pulp mills. These mills make the tough "kraft" paper, which is growing rapidly in popularity, and there are now over thirty of them in Canada. The liquor from the digesters in the sulphate pulp mills containing the resinous materials extracted from the wood and the chief chemical reagent, as sodium sulphate, is charged into the "smelting" furnace, where the carbonaceous materials are burned out and the sulphate is reduced to sulphide and thus regenerated.

The chief requirements for the lining of this furnace are that it should remain unfused at the high temperatures used (2000 deg. Fahr. or over) and that it should remain unattacked by the fused sodium sulphide on the bricks. Bricks of chrome and of talc fulfil these conditions and

the latter is so much the less expensive that it is generally used. It can be quarried so cheaply and then fashioned so easily by sawing into the shapes required that its use for the purpose seems secure for a long time to come.

Heretofore the soapstone blocks used in Canada have been imported, principally from the United States. Now there is a consistent Canadian production. During the past summer Mr. Louis Cyr has been quarrying and shipping the blocks for Canadian mills from his property two miles northeast of Robertson, Quebec, in the Thetford district of the Eastern Townships. The quality of the soapstone in these blocks is said to be better than those usually imported.

Here is native Canadian enterprise of the right sort, operating on a small scale, to be sure, but constituting an example of progress that can be duplicated a hundred times and that will, in the aggregate, means much to Canada's mineral industry. In a somewhat similar way there was inaugurated years ago the use of soapstone in the form of talc at Madoc, Ontario, an undertaking that has grown with the years to occupy a prominent place in the world's talc industry. It is not too much to hope that Canadian soapstone may enjoy eventually the reputation of Canadian talc.

AN ADVOCATE OF CAUTION

Mr. C. M. Campbell makes today, in these pages an unusually effective contribution to the discussion on the general dimensions of Canada's mineral resources that he originated last spring. He has examined critically statistics that most of us have accepted without question, and finds that they cannot be accepted at face value. He has been at great pains not only to analyze these statistics, but to collect and collate additional facts that have a vital bearing on the subject. He shows (what many of us suspected, but none other of us took the trouble to prove) that the mining industry of Canada does not comprise such a large fraction of our total national production and is not so important to our railways as certain over-all statistics would lead us to believe.

Without accepting all of Mr. Campbell's deductions from the facts he presents so clearly, we must realize the truth of most of what he says, and shall do well to shape our actions accordingly. The fact that such a large proportion of mineral products, notably iron ore and coal, carried by our railways is of foreign origin should stimulate us to replace it as far as possible with Canadian products. If we see clearly the dimensions of the sum lost annually through the export of raw minerals rather than the products of their manufacture, we will do our utmost to remedy the case to our own gain. An unclouded view of our National Railway lines shows thousands of miles built before their time; yet it shows also the lands they traverse, awaiting the prospector and the miner, to whom they promise much. If we see an annual wastage of our meagre capital resources in money due to misdirected enthusiasm, we must take pains in future to direct both capital and enthusiasm into more profitable channels.

As we pointed out some months ago in these columns, this discussion, in which Mr. Campbell and Dr. Corless consider themselves the proponents of opposing principles, elucidates, in our opinion, two different aspects of one and the same question, each of which is useful and indeed necessary in its own proper sphere. Without the optimism that has been the guiding principle of Dr. Corless' public utterances of late, there would be no prospecting, no development of prospects into mines, and hence, inevitably, a dying and then a dead mineral industry. Without the discriminating judgment advocated by Mr. Campbell, our engineers and investors would soon dissipate their tangible resources in attempting the impossible.

It is obvious that there is required a judicious combination of optimism and caution if we are to effect a rapid and sound development of our mineral resources. Seldom are these qualities combined in one man; hence co-operation is necessary among those possessed of these opposing inclinations. Men with the calculating caution that Mr. Campbell upholds must ally themselves with others having the enthusiastic temperament that impels them to the vital work of exploration and research.

It is impossible to prove or disprove the actual dimensions of Canada's future mineral industry and of her present latent possibilities; only the prospector and engineer of this and future generations can do that. Meantime we must provide for the use of the prospector and the engineer adequate means for their purpose, so far as is consistent with sound business management. By directing wisely the maximum of effort available, we shall make the most of what we have—and no one can do more than that. Mr. Campbell has provided a very useful contribution to this end.

HOW MUCH MONEY WILL THE SWINDLERS MAKE?

The "Golden Opportunities" are coming thick and fast, according to prediction. They are genuine opportunities—to the promoters of fake mines and bogus stock. The advertisements must be bringing a handsome income to the newspapers. Even the most cautious and conservative of our dailies has succombed to the lure of the full-page "ad." It is "in the swim", now, with all the rest of the daily press. It is very difficult to refuse advertising from any source, and it is almost impossible for any but those well versed in mining matters to discriminate between genuine and illicit mining stock promotions.

The *Canadian Mining Journal* accepts no advertisements of mine promotions. Adherence to this principle has put us under the painful necessity of refusing a lucrative source of income. We are confident that the facilities available allow us to distinguish sufficiently clearly between genuine and counterfeit; but we are determined to be under no suspicion of subsidy, whatever the cost. Our

hand is completely free to commend or to condemn, without fear or favour.

There has been, recently, only one gold mining stock offered to the public that we are prepared to recommend, without qualification, to the man who can afford a legitimate and promising speculative investment. There are a small number of stock flotations based upon mining properties that are of sufficient promise to warrant the expense of development; but we are not fully satisfied that the money obtained from the public has been expended wisely in all cases. We have refrained from adverse comment on these stock flotations; with good luck, they will pull through and may make a reasonable or even a handsome return on the investment.

There are a host of illicit stock flotations, based mostly upon mining claims that are not of sufficient promise to attract the genuine operator or mining investor. Some of them are in close proximity to producing mines—but that proves nothing in itself. Some are far removed from any productive area, and pretend to be close. All claim to have important geological and structural features in common with Ontario's famous gold mines; few of them have anything of the sort.

Even to enumerate these bogus stock flotations would take more space than we care to give them. They are multiplying daily, and each seems to be more of a barefaced swindle than the last. The circulars and the bogus mining periodicals got up for the occasion, as well as the strenuous campaign of newspaper advertising, are bound to separate some careless or credulous persons from their loose change. It is impossible to protect the fool from the swindler. We hope that few with ordinary common sense will be deceived by propaganda now being conducted by numerous members of the light fingered profession.

EDITORIAL NOTES

At least one part of the British Empire recognizes publicly and officially the prime importance of its mining industry. The South African Minister for Mines and Industries (note the significant conjunction of responsibilities) has recently issued his annual report for 1921. He mentions that the gold mines are working almost normally and the reorganization effected has reduced working costs in such a way as to enable the low grade mines "to carry on." He adds that still more efficient operation is essential to ensure the continuance of gold mining, the most important of South Africa's industries. The white miners, who were formerly not only autocratic but inordinately self seeking, have now commenced to work for a living. Apparently their habits of application are not yet sufficiently developed to meet the needs of the case.

On October 13th we stated, on page 687, in discussing "Institute Membership", that "the mining engineers of "Ontario have, at their own request, been excluded from "the provisions of the Professional Engineers Act of "Ontario." Mr. R. B. Wolsey, secretary of the Association of Professional Engineers of Ontario, has drawn our attention to the fact that this statement is decidedly in error. Mining engineers are included with others in the provisions of the Act. The misapprehension, which is not confined to the editor of the *Journal*, is probably due to a copy of the bill that was circulated last year, containing such an exemption, the bill as then drafted requiring all engineers practising in Ontario to join the Association. As passed by the Legislature, the Act incorporates a voluntary Association, there being no legal compulsion for practising engineers to join it. Thus the exclusion of mining engineers from its provisions, deemed necessary in the first instance, is not required in the bill as finally passed.

Coke of a dense variety is the best known substitute for anthracite coal for domestic use. It is with a view to making this excellent domestic fuel as a by-product that such a determined effort is being made to discover an economically feasible method of low-temperature carbonization. Meantime, the ordinary by-product process of making coke at a high temperature provides a first-rate fuel after saving part of the valuable volatile constituents. It may be feasible, even without any new invention, to bring bituminous coal westward from Nova Scotia and eastward from Alberta to large centres of population and there resolve it into its constituents, solid, liquid and gaseous, all of which can be used to advantage locally. This is one of the tentative proposals of the newly created Fuel Committee in Ottawa of which Dr. Charles Camsell is chairman. Mr. Moffatt's article in this issue on the manufacture of coke in Nova Scotia is timely.

The Financial Post of Toronto published last week a special supplement featuring Canada's mining industry. The consistent optimism, and even exuberance, of the special articles that compose this excellent resume of our mineral industry, present and future, is tempered by a most decided warning against the dangers of the indiscriminate buying of mining stock. *The Financial Post* is rendering the investing public a notable service in exposing undoubted fraud wherever it is found, whether in illicit mining stock promotions or in similar shady means of collecting cash from the gullible or the unwary.

The slide of rock in the pit of the Asbestos Mines, Limited, East Broughton, Quebec, last week, that killed four miners is one of those unfortunate accidents that cannot be foreseen nor provided against. The local management and Mr. Jacobs, at the headquarters office in Montreal, spared no pains or expense while there was still a faint hope that the huge blocks of rock might have lodged around rather than on, the entombed men. Here there is demonstrated, once more, the fact that human life is held above money in a well-ordered mine, as in any other part of our modern civilized life that rises above mere savagery.

Statistics and the Canadian Mining Industry

A LETTER FROM MR. C. M. CAMPBELL, GIVING STATISTICS AS TO CANADA'S MINERAL INDUSTRY

To the Editor,

Canadian Mining Journal.

Some months ago I wrote a letter to this journal protesting against what I considered extravagant language used in an editorial. This was the subject of some criticism, favorable and otherwise. About the same time Dr. Corless, as President of the Institute, made the public statement that mining would be "Canada's greatest industry of the future" and it was a "fact" that we "had inconceivable wealth in minerals." I therefore protested again as strongly as possible. This correspondence was the subject of an editorial by yourself and an article by your special contributor, Mr. Alexander Gray. The matter has been further discussed in the Bulletin of the Institute.

In investigating this subject I have tabulated a large amount of statistical information for my own guidance. I propose to submit some of these tables as I believe that the information they contain is of sufficient importance to well warrant this publicity.

It has been stated that anything can be proven by statistics and that there are lies, damned lies and statistics. Those submitted I believe to be correct and you and your readers can judge whether or not I have drawn any unwarranted conclusions therefrom.

Annual Production

The annual mineral production is, generally speaking, an indication of the mineral wealth of a nation. The following table indicates the relative importance of the mining industry in Canada and in some other areas on this continent.

	Mineral Production 1918	Pop.	Per Cap.
Pennsylvania	$979,245,098	8,720,017	$111
Oklahoma	336,857,921	2,028,283	166
W. Virginia	327,962,620	1,463,701	225
Illinois	271,244,365	6,485,280	41
Ohio	246,162,215	5,759,394	43
California	204,673,547	3,420,861	60
Arizona	203,992,915	334,161	614
Canada	211,301,897	8,788,483	24
United States	5,540,496,000	105,710,620	52

I have taken the year 1918 as it is the latest year for which the U. S. Geological Survey have published detailed statistics. It was also a year when production in all cases was at a maximum. The fact that the populations shewn are for 1920 and 1921 means that the per capita figures are only approximately correct. Relatively speaking they are very nearly correct.

From the above it will be seen that certain states that have not been popularly considered as mineral producers have a much greater per capita production than Canada, while an area like Arizona is not approached by any other state or province. I would not like to say that it is not possible for a province like British Columbia to have great undiscovered mineral deposits; but a trip through the coastal jungles of British Columbia will convince anyone that if mineral wealth is there it is likely to stay there except in the few cases where outcrops indicate the possibility of encouraging results. Though they might greatly increase our mineral wealth, British Columbians do not desire Arizona conditions. There are compensating advantages.

The next table compares the value of the mineral production of Canada with that of some other Canadian industries. The figures are also for 1918.

Dairy products	$256,000,000
Forestry	209,528,000
Goods manufactured in Hamilton	193,638,000
Mineral Production of Canada	211,301,897
Goods manufactured in Ontario	1,809,067,001

The above table shows that the production of one of the minor divisions of our agricultural industry is greater in value than the entire mineral production, that the forest production and the manufacturers of a city like Hamilton about equal it. In the case of manufactures, to avoid duplication, all statistics include a special column for cost of materials. In the manufacturing industry this is usually the greatest item. In the mining industry it is an appreciable item though seldom referred to. The millions of tons of Canadian coke that has been used in our smelters appears in our records as coke and also as part of the value of the smelter products produced. In the case of Hamilton the comparison is not an unfair one as the value of Canadian mineral products that entered the finished product was probably less than the value of the non-mineral supplies that went into the mineral output.

I have also included in the above table the total value of the goods manufactured in Ontario. An examination of the mineral production of that province shews that the proportion that appears in the total value of the manufactures is a small one. Ontario is a great manufacturing province and for its manufactures of metallic goods thanks are due mainly to raw mineral products from the neighboring states.

Mineral Imports

Mineral Statistics in Canada are confined to tables of production. This seems to me to give a one-sided idea of the situation and I have therefore compiled the following table shewing the imports of mineral products for 1921 as furnished by the Canada Year Book:

METALLIC		
Iron: Ore	$ 5,995,038	
Rolling Mills products	75,604,655	
Smelter products	4,583,053	
		$ 86,186,746
Aluminum:—Alumina	1,675,020	
Ingots, blocks, etc	566,944	
		2,241,964
Brass:—Bars, rods and coils	478,634	
Scrap	663,468	
Strips and sheets	376,350	
Tubing	366,884	
Woven wire	489,788	
		2,375,124
Copper:—Bars and rods	5,724,064	
Blocks, pig and ingots	1,396,327	
Strips, sheets & plates	586,399	
Tubing	319,536	
		8,026,326
Lead: Scrap, pigs and blocks		1,971,392
German, Nevada and Nickel Silver		526,741
Precious Metals		2,753,571
Tin and Products		2,962,644
Zinc and Products		584,474
Ores and metals n. o. p.		176,989

NON METALLIC	
Bricks, etc.	3,021,600
Coal	111,298,100
Coke	6,247,931
Glass and products	11,083,028
Petroleum and products	51,438,351
Stone and products	4,836,784
Diamonds (uncut)	2,384,150
Salt	1,372,199
Sulphur, crude	1,729,808
Fertilizers	4,272,054
Inorganic Chemicals	7,4 0,430
	$312,890,406

The above figures are for the fiscal year and should be compared with a mineral production of about $200,000,000 for the same period. Appreciable reductions should be made as the records do not in all cases exclude manufactured articles. However, after every allowance is considered I think it will be admitted that our total mineral production is less than our imports. The fact that we may have control of the nickel and asbestos situation and that the production of gold is increasing is seriously discounted when we study the list of minerals we are short of. The table also indicates that some of our industries are, to use the language of the photographer, being "developed" but not being "fixed". For example, among the metals we ship out our copper, lead and zinc in large quantity and then pay about as much to get part of it back again as we received for all that we exported. The introduction of refineries is a forward move, though the table indicates that there is room for much further endeavor.

Comparison with Other Industries

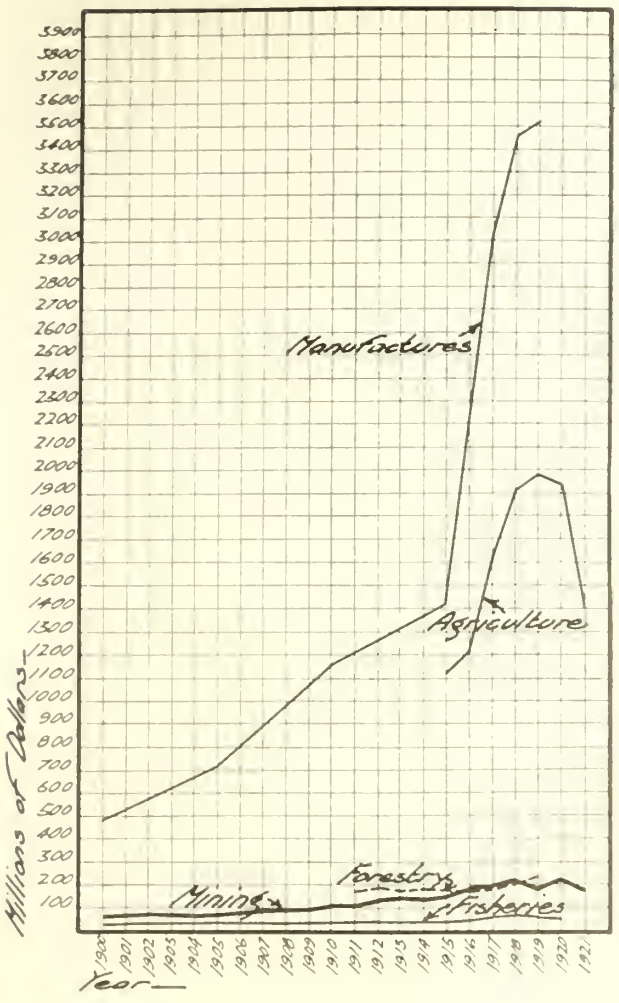
A comparison of the mineral industry with that of other industries for the last 20 years is shewn below in graphic form. The curves are not complete but are as complete as statistics supplied from Ottawa will permit. They shew mining production to occupy a place appreciably above fisheries but slightly below the forest production. Far above are the products of manufacture and agriculture. Canadian mining engineers have not been backward in declaring that the mining industry is forordained to soar in the upper ether. It would seem that the start of this meteoric flight is somewhat overdue.

Coal Statistics

Coal statistics have recently been brought into prominence by Dr. Corless' statement that we have 1,234 billion tons and his announcement that this would be good for 35,000 years, at the present rate of consumption, was telegraphed to all the daily papers and in many cases appeared in heavy type on the front pages. Dr. Corless is lauded in your journal as an "Optimistic Engineer", and men who make statements of this class as "Conrageous Leaders".

The above tonnage estimate was obtained from Vol. 2 of "The Coal Resources of the World", prepared by the Geological Survey of Canada. I am entirely at a loss to know how any mining engineer can arrive at Dr. Corless' estimate of 35,000 years after a study of the details as set out by the survey.

In the first place, 1,073 billions tons, or 7 tons out of every 8, is located in Alberta and the fact that the great bulk of our reserves is located in an area inaccessible, on account of freight rates, to the great majority of Canadians is a detail that should be emphasized when any statement is made in regard to our reserves. This is especially the case as other countries, with which we make comparisons, often not only have better coal but have it



better distributed. In the second place, 948 billion tons, or over 3 tons out of every 4, is lignite or similar low grade material that will not warrant transportation charges except for very short distance. Even if the heavy expenditures that are being made to devise some method of improving and briqueting this material result in success it can only be done at the expense of a heavy loss in the original tonnage figures. In the third place it is very essential to note that only 115 billion tons, or 1 ton in every 3 is "actual" coal, the balance being "probable" coal. This balance contains such items as a probable 17 billion tons, 2 ft. thick, located at a depth of from 4,000 ft. to 6,000 ft. In the fourth place, even this "actual" coal, as the record states, "includes seams 1 ft. thick to a depth of 4,000 ft." On Vancouver Island, unless the coal is extra good, it is not worked when it is under 3 ft. in thickness, even near the surface. At the other extreme are mines where the coal is too thick, such as one of the big mines at Coal Creek where only 10 ft. of a 40 ft. seam is worked. United States figures are based on coal 14 inches thick to a depth not exceeding 3,000 ft. The United States total of 3,225 billion tons specifically excludes 604 billion tons between 3,000 ft. and 6,000 ft. Due to the hallucination of the public that it is being robbed by the coal companies a state of mind brought about by extravagant statements in regard to our coal deposits—the competition of the coal companies with each other and the competition of all of them with the fuel oil industry, the price of coal is at such a level that only the best and most easily mined can be taken and the loss in recovery is simply enormous.

I have been accused of being a pessimist; of holding a "lugubrious brief"; of "attempting to belittle the mining

industry and of being lacking when it came to a question of intelligence. These remarks have been made in different journals and represent the penalty one pays for taking the negative side in a popular belief. My chief crime seems to be that I have insisted that engineering rules which apply to individual mines should also apply when statements of "fact" in regard to our national reserves are being made and when the life of these reserves is being estimated. No reputable company, it is generally admitted, in developing its property will estimate its life mainly on probable reserves; it will not ignore loss in recovery and it will not, if it be a coal company, seriously consider seams 1 ft. thick at a depth of 4,000 ft. National reserves, I am convinced, should be treated in the same way.

Possibly at some future date some means will be devised whereby thin seams will be worked, lignites improved so as to approximate anthracite and the present loss in recovery eliminated. However, until that day arrives this extra tonnage should not be used as a factor in estimating the life of our coal deposits. In addition to this I also think that our Geological Survey should seriously consider a revision of their figures downward and that public attention should be drawn more to the necessity of conservation even in coal.

The Mining Industry and the Railways

An entirely exaggerated idea of the importance of the mining industry in its relation to the railways is prevalent among American and Canadian mining men. The publications of the United States Bureau of Mines, even those that do not even remotely deal with railway statistics, contain tonnage tables designed to shew "the magnitude of the mining industry as a contributor to the revenue-producing freight carried by the American railways." These tables shew only half the truth and while it is very important that the effect of the mining freight should not be underestimated, it is just as important that it should not be overestimated. The deduction naturally made—that the importance of an industry to the railways can be approximately gauged by the proportion its freight tonnage bears to the total tonnage carried—is very wide of the mark.

The statistics in question, as far as Canada is concerned, are summarized in the latest Canada Year Book and tabulated for 1920 as follows:—

	Tons	
Products of Agriculture	23,304,979	18.3%
Products of Animals	3,801,130	3.0
Products of Mines	45,075,968	35.4
Products of Forests	22,278,880	17.5
Manufactures and miscellaneous	32,925,394	25.8
	127,429,154	100.

In justice to agriculture, the entire tonnage of animal produce should be credited to it, making that percentage 21.3 per cent. Unless one is familiar with actual conditions, he will assume that all this tonnage originated in Canada. As a matter of fact, 34,954,469 tons was obtained from United States roads and a further 27,379,108 tons was received from other roads in Canada. Restricting ourselves to Canadian tonnage and allowing for no duplication, the total can therefore be cut in half. Of the tonnage originating in the United States well over half, or close to 20,000,000 tons, represented mineral tonnage in the shape of coal imports to which the Canadian mining industry can lay no claim whatever. The tonnage supplied by the Canadian mining industry will therefore be seen to be a completely different figure.

In a paper by Dr. Camsell at the last meeting of the Institute he said, "Possibly if the figures were given in ton-miles the percentage of the other groups might rise at the expense of the mine products." In following up this lead and in taking into consideration the different rates on different articles I find that the percentage of other groups rises to such an extent as to demand an altogether different conclusion than the one prevailing, as to the supreme importance of the mining industry to the railways.

As the table now stands it puts a transcontinental silk train—and the silk traffic is an important one, for our Empress boats have brought in silk cargoes valued as high as $8,500,000—on the same basis as a train of gravel from a suburban pit into a city. It makes no difference whatever between 4 times 1st class, and 10th class rates. The table includes some very heavy tonnages on short hauls, such as 1,882,774 tons hauled by the Algoma Eastern consisting mainly of raw ore, coke and flux for the Copper Cliff Smelter and 3,484,094 tons, almost entirely coal, handled by the Sydney and Louisburg Railway which has a total length of only 69 miles. Tonnages such as these should really be deducted, as railways of this type are often operated by the mining companies as part of their own equipment. Examples are the roads operated by the Granby Company at Anyox and the Canadian Collieries on Vancouver Island.

An examination into the details of the mining tonnage as given in the following table shews that the items are mainly of that bulky class which takes about 10th class rates and which are characterized by a short haul:

	Tons.
Coal and coke	33,796,034
Iron Ore	899,546
Other ores and concentrates	2,127,184
Base bullion and matte	173,851
Clay, gravel, sand, crushed stone	4,473,155
Slate, dimension or block stone	1,216,140
Crude petroleum	1,051,006
Asphaltum	248,672
Salt	307,135
Other mine products	782,245
	45,075,968

All railways do not prepare their statistics on a ton-mile basis or segregate their revenues. A table of this nature for all Canada is therefore not possible. The following table for 1921 based on these figures, from the point of view of the Canadian Pacific is, however, submitted. As this is an outstanding railway covering all parts of Canada this table represents, I think, a more accurate idea of the relative importance of the different industries to the railway:

Class	Tons.	%	Ton-Miles	%	Revenue	%
Agriculture and animals	11,310,372	38.5	5,473,863,186	51.	$46,258,805.01	36.2
Mines	3,686,840	12.6	742,287,120	6.9	6,646,898.41	5.2
Forests	2,432,491	8.3	1,165,319,850	10.8	10,824,168.01	8.6
Manufactures and other products	11,893,457	40.6	3,359,459,766	31.3	63,952,599.78	50.0
Total	29,325,160	100.	10,740,929,922	100.	$127,682,471.21	100.

Those who followed the recent freight inquiry will also remember that the statement was often made by railway officials that the carrying of low grade commodities resulted in actual loss. I do not know what this loss amounts to and do not think it is serious, but am prepared to believe that in the case of much of the mineral freight carried the profit is very small. In other words the mines may even produce a smaller proportion of net profit than the revenue percentage would indicate. On the other hand some semi-manufactured products now classed as manufactures might legitimately be classed with the mine products. Agriculture and forest figures would also be raised for the same reason. Iron products, however, could hardly qualify, as our production of iron ore is negligible. Even making a liberal allowance for these additions and the possibility that the Canadian Pacific table may not quite represent the railways as a whole it is obvious that the Canadian mining industry occupies an interior position far below the keystone location that the tonnage table would indicate. That its position can be improved, I have no doubt, and the endeavors of the Geological Survey along this line will be watched with interest and approval.

Prophecies

An editorial which was published in the issue of June 9th, indicates that you are under the impression that Dr. Corless' statement was in the nature of a prophecy. Mr. Gray seems to be of the same opinion, for in discussing the situation about the same time he claims the matter "is incapable of general solution until a few decades have elapsed and more work is done." Dr. Corless' statement was a statement of 'fact' and not a prophecy and as such there is no occasion for any delay in estimating its accuracy. If it is a "fact" that our mineral wealth is "so great that it cannot be conceived or imaged by the mind" the truth of the matter should be so apparent as not to call for any intensive program to prove it.

Many prophecies have been made in regard to our mineral wealth. They are usually elusive, as the prophets seldom include a time limit for their fulfilment. The following parallel, however, shows how one prophecy went astray.

[illegible]

"The supply of base ore material from ores entering into the production of iron and steel products has to-day come to a point where [illegible] supply of iron ore is [illegible] at any point in Canada." — Canadian Mining Journal, April 15th, 1913.

[illegible]

I do not know what Canadian mining engineers told Dr. Herbert that made him publish the ridiculous prophecy attributed to him. The information supplied, however, was [illegible] with that which was being supplied elsewhere and at the same time by other Canadians to outsiders who invested in rock exposures under the impression they were buying fruit lands. As far as I know the prophecy was not contradicted and it appeared in the Canadian Annual Review for 1905 as one of the outstanding development incidents of that year. It had its share in bringing about the boom conditions that lasted till about 1912 and from which we are likely to suffer for many years.

Other statistics on propheeies include the sayings: "Never prophesy unless you know" and, "Prophecy is the most gratuitous form of error."

Sporting Spirit vs. Engineering

Before closing I wish to draw attention to another remark of Mr. Gray's that should not pass unchallenged, for similar remarks are still being made. It is his concluding sentence in the article referred to. He says, "Sporting spirit is what makes the world move". This may be all right for a sporting magazine, but for an engineering journal I would suggest that, if it is to be used as a rule, the word "backward" be added. Much the same advice is given by Mr. G. R. Mickle when he concludes his letter in the current *Bulletin* with the sentence, "Let us take a chance."

About 10 years ago the people of British Columbia, then worshipping the false gods, Inconceivable Wealth and Sporting Chance, embarked on the construction of the Pacific Great Eastern Railway, projected so as to penetrate the heart of the province. This railway has cost the province over $10,000,000 to date. Railway experts of national reputation have gone into the situation in detail and now find that there is no prospect that traffic can be created as a result of development, and this includes mining development, for many years to come. They also find that unless the people are prepared to continue paying from $2,000,000 to $2,500,000 yearly the proposition should be abandoned in whole or in part.

The raising of this money by increased taxation and by cutting down expenditures has meant a heavy handicap to this province. Income taxes have been put on much the same basis as those of the Dominion; the poll tax has been resurrected and every other form of tax exploited; mining companies complain of unfair and retroactive taxation and other industries denounce taxes as having increased by leaps and bounds. All the Government departments are suffering from lack of funds. Schools now built are of a cheaper type or not built at all and the University has to conduct classes in tents. Provincial roads are dangerous in places. Mining investigations which were formerly made at the expense of the Government have now to be made by the companies or not made at all. There is no attempt at reforestation and the debris from logging is not cleared up. Last summer there were 2250 forest fires. Lives have been lost and, though fortunately there have been no tragedies such as those in Northern Ontario, there is no assurance that these may not occur. For three months during the past season it was impossible to see across the Straits of Georgia and at times the smoke was so dense that vessels had to use their foghorns. There is now only one stand of virgin timber along the highway between Victoria and Alberni and a trip through this is an experience to be remembered. The Government cannot afford to preserve this, has said so, and we can only prepare to contemplate a desert of blackened stumps and fireweed. In California they plant trees by the side of highways and preserve their beauty spots. [illegible] Columbia we are in such a position that [illegible] to pay interest on our gambling debts.

"We will muddle through in true British fashion," said Premier Oliver. The number of individuals and corpora-

tions, however, that didn't "muddle through" when the boom burst is legion, and it is not uncommon these days to read of municipalities that are bankrupt. Even if the P. G. E. is abandoned the salvage is limited and there will always be a heavy interest charge. Another sporting move like this project and the province may be sold out at a sheriff's sale.

The present generation in B. C. came into a wonderful heritage. An appreciable part of it has been destroyed and we are handing it down not only seriously impaired but with an additional heritage of heavy debt. I cannot see anything sportsmanlike in this. I am prepared to pay my share and more than my share to help clean things up but I do not propose to stand idly by while leaders in the mining engineering profession continue to publish statements that are not only unjustifiable from an engineering standpoint but also have a tendency to tempt governments and communities to make further extravagant expenditures.

Yours, etc.

C. M. CAMPBELL.

Cassidy, B. C.
October 16th., 1922.

The Manufacture of Coke

BY-PRODUCTS PLANT AT SYDNEY

By JOHN MOFFATT

The By Product Department of the Sydney Steel Plant is most interesting, especially to the layman who in his own way has learned of the many things, besides heat, that can be extracted from coal.

A Scene of Order

The first impression one receives on looking over these extensive works is the simplicity of the arrangement, of its large buildings and railway tracks, the order and taste with which everything is laid out, the safe and sanitary conditions under which men work, the clock-like precision with which all work is done, and the ingenious machinery used in doing much of it, as well as the marvellous results obtained within a few hours by undoing what it has taken nature many thousands of years to do. The level yards with their many covered-in pipe lines and their whitewashed curbs or brick arches just high enough above the surface to afford a clean footpath (if that were at all necessary where the ground looks as if it had been newly rolled), and the dolomite walks of other more defined and permanent pathways, all add to the comfort and convenience of getting round; and if one adds to this the pleasure of listening for the first time to a highly intelligent workman explaining the different processes by which coal is made to give up its varied stores of wealth, the attention and interest are held spellbound while he passes from one phase of the work to another. Here and there on the way round, sheltering behind high buildings or adorning the centre of a well-trimmed lawn, are beautiful little flower gardens, all tending to give a feeling of the aesthetic and of repose in the center of this hive of industry. It is good that it is so. It was Darwin who said that the pursuit of scientific study over a long life lost him the capacity to see the beauty of a flower.

Here where scientific minds, with all the ardor of their profession, spurred on by the fierce conflict of commercialism, are liable to be robbed of the taste for the beautiful things in life, it is well that the eye should be arrested by the artistic and the fragrant flowers that "toil not neither do they spin."

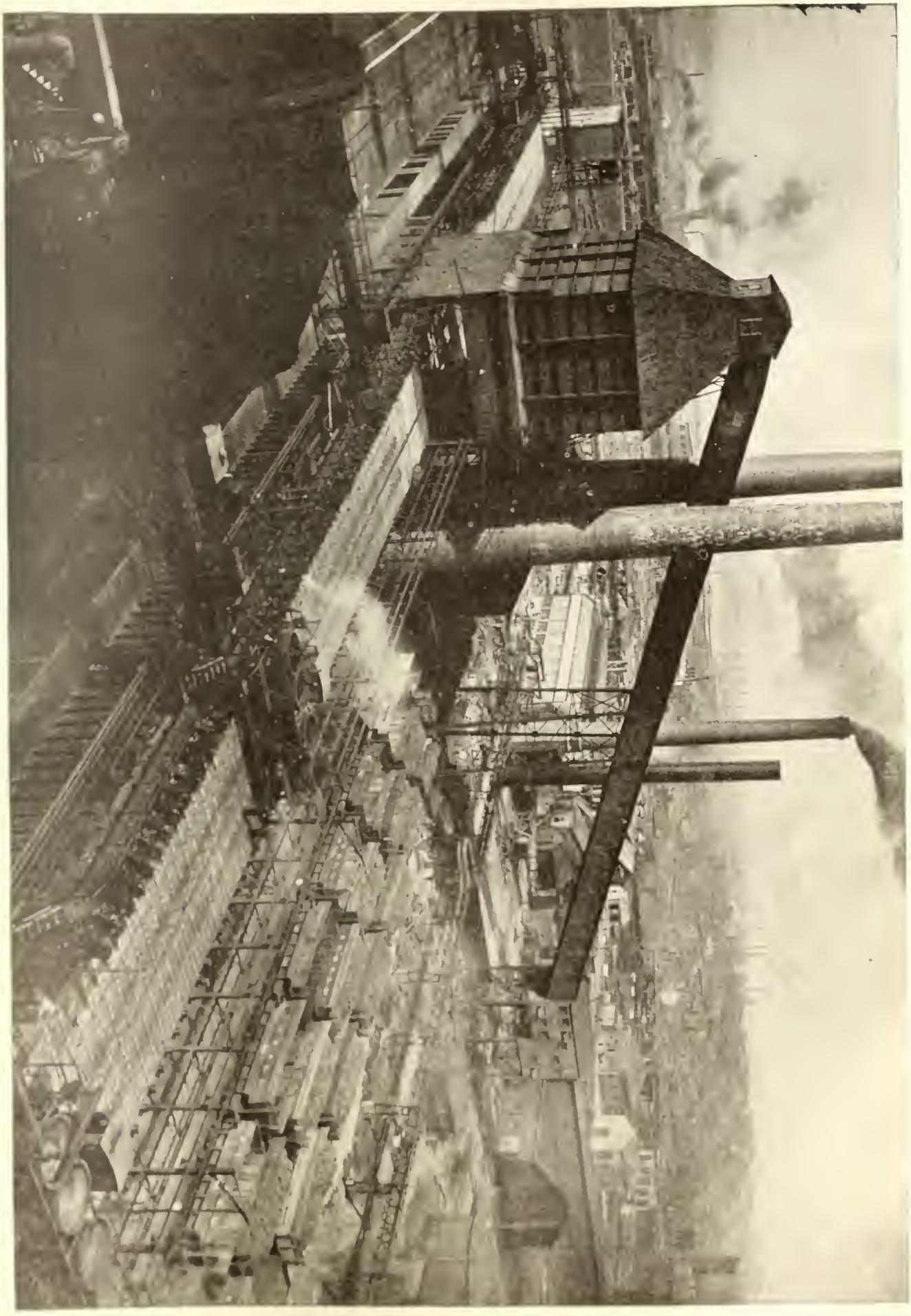
The Coke Ovens

The Dominion Iron and Steel Company has never been very prodigal in the use of coal. Only for a short time at the beginning were Bee Hive coke ovens used. "In 1900 five hundred ovens of the Otto Hoffman type were built. These had a coking period of 48 hours and a daily capacity of 1,000 tons, and when the plant was in full operation 400 men were employed. But twenty-two years works many changes and sees old methods of doing things dropped and old machinery scrapped. The Dominion Steel Company, to keep abreast of the times, have within that period twice changed their coking plant, improving it each time, so that two batteries of 60 ovens each now produce 1,200 tons of coke per day. The ovens are larger, but with the improvements in construction and heating, coke is turned out in eighteen hours, as against forty-eight in 1900. With dry coal the time period of the new ovens is sixteen and one half hours. The wet slack as it comes from the washer carries eleven per cent. moisture and requires a higher temperature and a longer time to dry this off and make coke. The increased output is made with 200 men, or a reduction in force of 200 men per day. This is surely economy of the highest order and points to tremendous progress in the making and handling of coke. To revolutionise a plant of this size costs money; but it pays and it is only by keeping in the forefront that trade can be obtained and profits made.

A complete description of this plant was given some time ago in *"Iron and Steel of Canada"* by Superintendent C. E. Wallen, an English gentleman, educated in Oxford, who followed up his chemistry studies in Vickers Works and in the Sydney Steel Works after coming to Cape Breton. He is thoroughly qualified and capable and fills his position with ability and success. I will not therefore attempt the impossible (to me) and try to repeat the description.

Separate Quenching Area

A noticeable feature of the change wrought through the introduction of machinery, is that in respect to labour, especially that part of it that has to do with the work of making coke. Five hundred coke ovens had, at the beginning, to be discharged by hand and cooled by hose at the place of discharge. It was hot, dirty, disagreeable and tedious work and required a large number of men. In striking contrast today is the speed with which this work is done and the ovens relieved of their charge, the whole being forcibly pushed out in a few minutes by machinery into a wide dumping car of steel and cast-iron construction. The car is then removed by an electric locomotive to the quenching station where the coke is subjected to a spray of water for 35 to 40 seconds. After draining in the car for five minutes it is discharged to the coke wharf. No change could be more complete, and the absence of smoke in the rapid cooling has taken away the standing reproach of the coke oven department, which because of its stifling fumes and its smoky, murky atmosphere is iso-



BY-PRODUCT COKE OVENS AT SYDNEY, NOVA SCOTIA.

hated, far away from the homes of men and placed outside the pale of civilization. This leprous blight has all been removed, and the cooling having been relieved of its fiery and poisonous breath and its smoke screens, the coke department may now be freely admitted to the company of other respectable and less despised parts of the main works.

Coke Used Immediately

Coke is not stored, and the work of the ovens is timed to meet the requirements of the furnaces and foundries. This requires nice manipulation and a thorough knowledge of the quantity wanted. But when one looks at the time clocks and charts, by which the making of coke is regulated, the heat being changed from one side or other of the oven every half hour, one can easily understand how coke can be delivered at any specified hour.

Coke, like coal, must be screened to remove the fine sizes. The quality of the coke is good and the supply of metallurgical coal so far as known may be only limited by the distance to which undersea mining can be successfully carried on.

The recent activity at the Steel Plant and the putting into operation of a second blast furnace almost doubled the quantity of coke used, and if trade should continue to improve further and the third blast furnace be blown in, all three batteries of improved type would be required. Many of the older ovens have been repaired and if wartime activity should again return the coke supply will be equal to the demand. As it is, more could be done by the present ovens; but as the method of doing it might be a trade secret we shall pass it over.

The By-Products

In reply to a question asked, if the ammonia fumes were not injurious to health, the answer was that they are not known to be and that such small quantities escape into the atmosphere that no workman has been known to be affected by them. No complaint was ever heard, but to the contrary a little ammonia in the air is held to be a disinfectant. Working with tar is known to be wholesome so long as plenty of fresh air is admitted to the buildings, or the work done in the open, as is the case here.

Sulphate of ammonia, tar, benzol and gas, are the chief by-products. The recovery made under the improved conditions are tar, 11 gals. per ton coal, as against 7½ gals in the old ovens, sulphate of ammonia per ton coal, 18 to 28½ pounds; surplus gas, 3000 to 6400 cu. ft.

After the volatile matter has been distilled from the coal, the tar is extracted and the gas treated by various processes until in turn all the products desired are obtained.

The increased yield of by-products from coal in ovens of recent design is largely due to developments that have taken place in the last ten years. The oven construction itself is of a more solid nature, the temperature of carbonisation is more accurately controlled, and the pressure and temperature of the gas generated are, during the various phases of its subsequent treatment, regarded as a matter of the highest importance. To such an extent is this the case that in the plant under notice some forty automatic regulators and temperature and pressure recorders are in operation. The result is that not only is more uniform operation obtained, but the workmen have a readily visible indication should anything abnormal occur. In addition, each part of the operation is the subject of constant chemical control.

The Market for By-Products

Sulphate of ammonia is in great demand in the West Indies on the sugar plantations. The Tar and Chemical Co., Sydney, use up all the tar, and here other by-products are extracted. These are creosote of several kinds, cement roofing, and disinfectants. Pitch, being the residue of tar, is exported in large quantities. Napthalene and other light and heavy oils were for a time included in the by-products of tar, but for the present some of these are not extracted and are allowed to remain in the pitch.

Benzol sprang into favor as a motor fuel and is preferred to gasolene. Unfortunately the storage capacity of the plant is limited and the supply this year was used up within a few months. There was general lamentation among autoists when it became known that benzol was almost off the market. There should, however, be some way of storing a larger supply and saving the benzol, for if it cannot be safely and economically stored, it is not extracted and is lost as a by-product. The use of the motor car, in a climate like Cape Breton, is only seasonal, and the full output of at least four or five months would have to be stored, for auto driving after October is seldom done for pleasure. The matter is under consideration and in due time the case will be met.

Other by-products extracted during the war were toluol, xylol, and solvent naptha of the highest degree of purity and in great quantities. Not the least cause for pride among Nova Scotians was the fact that the industries of the Province could be made to play a great part in the world struggle for the right, and foremost among these industries was the great Dominion Steel Works at Sydney.

GOLD REPORTED IN NEW BRUNSWICK

Press despatches record two discoveries of gold in New Brunswiek, one near Shippegan in the northeast corner of the province and the other in Carleton County, near the Maine boundary. Prospectors licenses have been take out in both cases. Mining is very backward in the Province of New Brunswick and there has been very little prospecting done throughout the interior, though a large part of it is readily accessible by railway and has rocks of such geological character as make mineral occurrences possible. A genuine gold find of workable dimensions would, doubtless, attract prospectors from other parts of Canada and would stimulate a thorough search through this long neglected part of Canada.

Preliminary returns to the United States Geological Survey on coal production in the fourth week of October indicate a total of 12,500,000 net tons, of which about 10,400,000 tons is bituminous coal and 2,100,000 is anthracite. Revised estimates for the third week show 10,365,000 tons of bituminous and 2,003,000 tons of anthracite. A slight increase in the total coal raised is thus shown for the present week as compared with the week before, which increase is practically entirely in the output of anthracite. The gain in the rate of production during the past two weeks reflects some improvement in the transportation situation which, however, remains the principal factor limiting output. The rate of output is approaching adequacy but does not yet assure sufficient coal to meet current needs, the required movement up the Lakes, and to provide the desired consumers stocks.

News and Comments

BY ALEXANDER GRAY

The Gaspe Zinc-Lead Impasse

Gen. Charles A. Smartt has asked the Quebec Government for all the correspondence bearing upon the endeavors of the Federal Zinc & Lead Company to obtain assistance in the construction of a road suitable for tractors, to connect with its Gaspé mines, of conceded importance. Whether or not relief will be accorded as a result of the Smartt inquiry, is not for discussion here. That the zinc-lead deposits developed and capable of further great development, are of exceptional merit, no longer is in dispute. Prominent engineers representing rival concerns of Canada and the United States pronounce the Gaspé occurrences to be unusually strong. The country in general has all the attributes essential to mineral discoveries, so the Federal Company has not the only bird in the bush. It is not strictly equitable to compel the Federal Company to build an expensive highway when the whole section will be benefitted. Besides, there is a market for zinc and lead. The further cost involved in the completion of the road would be trifling compared with the momentum the expenditure would give to the development of the peninsula. The equities, if not the exigencies, suggest co-operation on the part of the Quebec Government. Called for zinc and lead in quality and quantity when A. J. Sharpe, a world authority on the subject declares "a critical famine in zinc has almost arrived in Europe as well as in the United States. With production cannot keep pace with consumption in Europe, stocks have steadily decreased and prices have just as constantly advanced. European consumption is growing, production is not increasing, stocks are virtually non-existent, so the elements are all present for an excited market."

What Hollinger and Dome are Doing

Hollinger Consolidated production figures to September 9th and Dome Mines results to September 30th, make an illuminating comparison from which it is possible to forecast with the greatest ease of their 1922 operations will be. In the four weekly periods up to September 9th the Hollinger Company milled 1,016,280 tons, indicating for the year 1,160,000 tons. For the year to the fourteen period of the nine periods represented a gross yield of $8,899,758.25, of which $8,573,761.[illegible] is observing that if the same rate of prosperity is maintained in the remaining four periods the Hollinger Company will come near to the $13,000,000 mark. At the current rate, the year's gross production will be about $12,000,000, of which about $2,[illegible] will be recovered. The average of the grade hereto milled is $8.88 and the working cost $4.14 per ton. With profits exceeding $800,000 per month, and special profits from investments and other sources amounting to $401,[illegible]56 in the nine four weekly periods, it is natural that gold promoters are eager to [illegible] Hollinger. Net current assets on September 9th were $7,[illegible]49.87. As there is 501,495 tons broken in the stopes and 2[illegible]1 men are employed, the company is fortified with all the power for a greater programme. At this writing the Hollinger mines have accounted for approximately $7,100,000 in bullion.

Coincidentally the Dome Mines results are correspondingly flattering. For the half year ended September 30th, the profits amounted to $970,297, which compares with $1,307,275.79 for the whole year ended March 31st. The earnings before deducting depreciation charges and depletion, amounted to $1,230,593, to which other income of $79,561 had to be added. This is by far the best showing made in the history of the Dome Company, with this aggregate record:

Year	Gold Recovered	Operating Expense	Net Operating Earnings
1913	$1,043,994.93	$ 534,038.83	$ 509,956.10
1914	1,204,597.64	615,513.46	589,084.18
1915	1,055,496.78	747,195.70	308,301.08
1916	1,778,958.91	889,594.24	889,364.67
1917	2,171,784.83	1,241,862.15	929,922.38
1918*	1,030,758.30	812,852.16	217,906.14
1919 (Milling Plant was shut down)		237,279.24	237,279.24
1920	1,773,374.44	930,762.31	842,612.13
1921	1,946,403.06	239,508.69	706,894.37
1922	2,809,452.38	1,640,844.90	1,307,275.79
1922 April-September	2,165,384.00	1,230,593.00	970,297.00
TOTALS	$16,980,205.27	$9,120,044.98	$7,508,893.08

* In 1918 the mill ran only eight months.

The tonnage milled during the past half year was 183,950. The grade of this ore must have averaged about $11.00, for the net average profit per ton was $7.122. This compares with a net profit of $2.819 in 1921. The net yield for September was $8.685.

The combined gold production of the Hollinger and Dome Mines this year will not fall far short of $16,900,000. In that event those two companies will have produced about $79,000,000, of which approximately $60,000,000 will be Hollinger's portion. Both companies are strong in their cash and other liquid assets.

"Another Hollinger has been Discovered"

The "Bankers' Securities Corporation" seems to be a surcharged source of information when it announces that "another Hollinger has been discovered" that

- Geological conditions identical with Hollinger
- Surface showing of ore higher than Hollinger
- Veins larger and values higher than Hollinger
- Ore similar to Hollinger
- Showing better than Hollinger when at similar stage of development.

Rather than squander such an opportunity with a "small initial issue" is contemplated. "Until you hear the company you will be told about begins to circulate."

These alluring inducements appear in the Montreal daily papers. At the same time one of those papers says that the public is surfeited with oils and coal and gold schemes "mining" schemes. Manifestly the Bankers' Securities Corporation" is courting [illegible]. The individuals behind such attempts to corner a prospect in the "mouse pasture" belt of [illegible] Tree prodigy enriched by all the known methods of deception and then some, with the Hollinger [illegible] incidentally to obtain small change to [illegible] forget that the public is not [illegible] powers of observation and [illegible] agers of daily newspapers accepting [illegible] probably meretricious, are hardly [illegible] principals among the promoters.

Dome Directors Protest

While Hollinger directors are indifferent as to the claims of catch penny promoters that "another Hollinger has been discovered", directors of the Dome Mines have formerly notified their shareholders not to give heed to representations connecting them with outside mining ventures. At a recent meeting Dome directors fully discussed this matter and vigorous language was employed, because of the impression being cultivated that the Dome organization is officially or unofficially sponsoring certain other enterprises. It is easy to understand why Hollinger and Dome credit should be tapped — but not to the point of discredit.

Mine Labor and Power

Before producing mines, properties undergoing exploration and development, and all the prospects about which their owners are so optimistic can be sure of maintaining or even attaining to their strides, it is becoming a matter of urgent moment that power and labor be provided. A dry season may or may not mean that the North Country will have another of those interruptions which, though temporary, are intolerable. It is a fact that certain of the Mine Managers have been keeping close check on conditions and that they are apprehensive. Daily newspapers clamorous for greater production hardly realize that if Ontario is to be the source of gold to the extent forecasted by them, there will have to be cheap, permanent power, and plenty of it. One power company may not be able to meet the whole situation. As for the labor problem, it looms disconcertingly. Ottawa has promised to modify immigration regulation, but it will have to do so intelligently. There is a shortage of men in the bush. Labor of a kind is lacking. Statesmen and politicians cease to be such and are unpatriotic when they superimpose handicaps on industry, and at a reconstructive time. Chairmen Gary and Grace, of the United States Steel and Bethlehem Steel Corporations, respectively, have publicly appealed for the relaxation of immigration restrictions. This department of *The Canadian Mining Journal* has explained why the largest of steel corporation have raised wages. They felt they had to for more than one reason. President Grace reaffirmed last week the urgency of their needs. In this connection, *The New York Sun* of October 27, had a pertinent paragraph—

"The shortage of unskilled labor, admittedly assuming large proportions, is held by a number of the prominent leaders as the most serious obstacle in the way of prosperity. Judge E. H. Gary, chairman of the United States Steel Corporation, addressing the American Iron and Steel Institute, held the percentage immigration laws as the direct cause. He stated many regarded the law as unreasonable and believes therefore it should be promptly changed. Curtailment in operations and delay in construction work were attributed to the same condition by E. G. Grace, president of the Bethlehem. Industry in this country cannot continue to grow and prosper as in the past, he said, without a substantial yearly supply of new labor. Not a dearth of credit, but a shortage of labor combined with an overburdened transportation system, is the opinion of Col. L. P. Ayres of the Cleveland Trust Company, will serve to end the present rise in this tide of business."

At least two large Ontario gold producers have foreseen the ultimate effect of Ottawa's inhibitions, unless relief be given. Hydro-electric and human power mean more than politics to the whole Canadian people.

"Canada's Century"

Those "doubting Thomases" who frowned upon Cobalt, jeered at Porcupine, pooh-poohed Kirkland Lake, scoffed at Portland Canal, have another chance offered to them in the most recent discoveries of a "fourteen-foot ledge of silver" on the "Big Missouri" the other side of the mountain, across the glacier from the Premier, and of gold and platinum sands in the Fraser River. Porcupine survived its critics; Kirkland Lake, perhaps presents a broader field for wise money. What operating mines there are in Northern Ontario, and what the geological conditions make worthy of effort beyond the pocket books of a Public that is being asked to take cheap script, have "the fecundity of the pack rabbit and the feline" of the domesticated or wild variety.

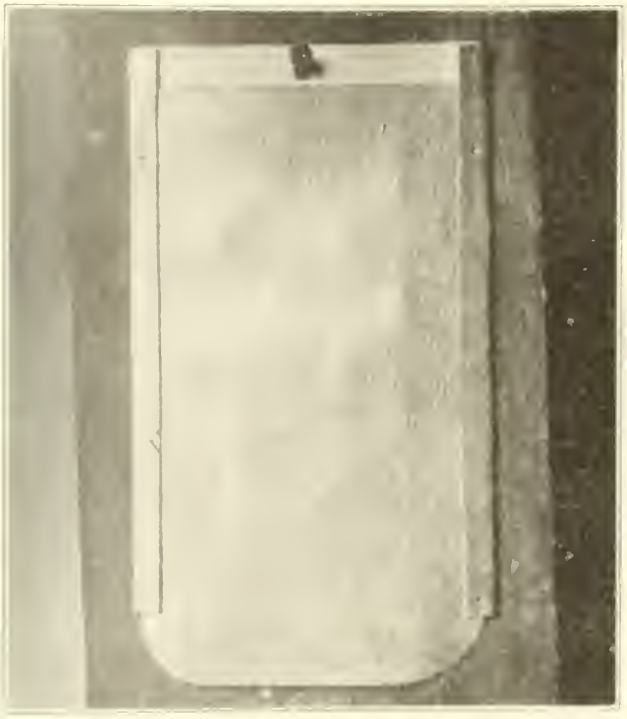
A certain amount of wild-catting is indispensable—if not made too expansive. As evidence of this, there is the experience with the "Big Missouri". It was belauded and belaboured. Holders of options tried and tried again. It met with favor when Neill struck it rich on the Premier, and immediately went into disfavor when New England capital sampled the outcrops. Later Sir Donald Mann, counselled by an eminent Geologist, took it over. The drill was employed, and views regarding secondary enrichment underwent revision. Again there was an abandonment. It reverted to the owner. Then New York interests did some work and dropped out. Finally, the Trites-Wood-Neill-Wilson party seems to have had an eye to windward, being good judges and weather-wise owing to what was learned at the Premier. So the Big Missouri underwent another investigation and it will be all the more interesting to have the details of the find reported in the daily press, to the effect that there is " a fourteen-foot ledge of silver."

Undoubtedly Portland Canal is receiving attention from those American interests controlling the Premier and other properties in the locality, as well as in the Mayo District to the north. The slim pocketbook may not be adequate for the purposes of the Pacific Province, but large ore-bodies and satisfactory values will supply enough magnetism to draw the necessary funds. To be sure, the Guggenheim technical staff will not take a half-portion where a whole meal with the trimmings will make principals more comfortable. As usual, in the meanwhile, Canadian capitalists of the East are rather obsessed with the perennial view that having to do with Mining is censurable, as repulsive as the flesh of a certain international animal is to the followers of Mahomet or those who took their cue from Siani. Of the Fraser River gold and platinum, it is to be said only, that the "bars" may not be so musical as the wires suggest. Considerable platinum has been taken from British Columbia rivers. No doubt there is more where it came from; but fishing in the Fraser has not been very productive in many ways, of late. At any rate, it is possible the platinum will be more plentiful — as plentiful as it was said, a while back, amber was going to be, owing to it being found in sizes of building blocks in a coal mine.

The value of diamonds exported from the alluvial diamond field of British Guiana during the first nine months of 1922 exceeded $2,000,000.

KEEPING STOCK RECORDS CLEAN

A frequent objection to keeping a list of the contents of racks, bins, etc., close at hand for easy reference is that the record sheet soon become almost unreadable by reason of the dirt and grease it collects after a short time in use. It is impossible, of course, for any storeman handling metal to have clean hands and wherever lists of material



and the like are hung up in the storeroom and it is necessary that additional information be added from time to time, some method should be adopted whereby the paper is protected at all times.

A stock record holder that has proved advantageous is illustrated in the accompanying photographs. This holder was made from a piece of scrap sheet brass, one part having both sides bent over and the other piece cut to slide between. Four punch marks provide the necessary friction to hold both parts together. The paper is attached by turning it back over the top and bottom and glueing it to the back. In the first illustration the holder is shown closed, in the second the cover is partly withdrawn, illustrating how the paper is protected from contact with the writer's hand.

A LITTLE TALK ON THRIFT

By S. W. STRAUS, President American Society for Thrift

It is difficult to break away from old habits, and, for this reason the hardest dollar to save generally is the first one.

After the start in saving money has been made, the way becomes continually easier because the new habits of life gradually become more fixed.

The reason many persons do not practice thrift is not that they do not appreciate its advantages, but they never can bring themselves to the point of making the start. It is so much easier to procrastinate and say "next week, next month or next year." But the best time to begin thrift is the present moment. Tomorrow will bring its difficulties, its problems and its temptations. Nothing whatever can be gained by putting off the day of a beginning in thrift.

It should be borne in mind also the amount of money one saves at the beginning is not of importance. The chief factor in the process is making the actual start. After this has been accomplished, one's own enthusiasm will assure the saving of the largest possible sums. It is well to make the matter of saving money a part of one's regular routine. Save systematically.

It also is well to keep a record of one's expenditures. In brief, try to run your personal affairs with much the same accuracy and careful accountancy methods that are practiced by wisely administered business corporations.

Bear in mind as well that, with your resolution to practice thrift and surrender some of the indulgences, pleasures and vanities of life, you will not be the loser in actual happiness. Living beyond one's means without provision for the future does not bring happiness. The sense of security that comes when one really begins to get ahead is a far more substantial and satisfying joy than any that can be obtained from pleasures purchased with money that should be saved.

Make the start in thrift today. Do not be even discouraged if the first sum you save is only a few pennies.

The important question is not how much, but when.

Excitement grows apace as a number of the wells in southern Alberta near the new oil field of Montana near their objective. There is good reason to believe that one or other of these wells will bring in oil. Should oil be found, there will doubtless be a wild stampede to the district as well as a recurrence of excitement in the other presumptive oil fields of the province.

The Smart Turner Machine Co., Ltd., Hamilton, have lately supplied a number of their pumps for mine and quarry use. Mr. H. F. Routley, Toronto, has just installed at his quarry near Caledonia a No. 1 belt-driven centrifugal pump. They are getting out a 5 x 6 Triplex Power Pump for Vipond North Dome Mines, Timmins, Ont.

Coal Commission in Session

JOHN HAYES HAMMOND DELINEATES THE PROBLEMS TO BE INVESTIGATED

At the three conferences held this week between the United States Coal Commission and the three delegations representing mine workers, bituminous, and anthracite operators, the letter which follows was addressed to each committee. The purpose of the letter as of the conferences themselves was to invite the full cooperation of the coal industry itself. Without exception the response at these meetings with the commission was hearty and such as to promise results in the program to be undertaken. The letter is of such significance to Canadian as well as to Americans that we reproduce it in full.

Gentlemen:

The U. S. Coal Commission appreciates the offer of cooperation on the part of your organization with it in the discharge of the duties imposed upon it by Act of Congress "to investigate and ascertain fully the facts and conditions and study the problems and questions relative to the coal industry with a view to and for the purpose of aiding, assisting and advising Congress in matters of legislation which would insure a supply of this commodity to the industries and the people generally throughout the country and maintain the uninterrupted flow of commerce among the states, or any legislation which Congress may after said investigation deem wise and which under the Constitution Congress has the power to enact."

To this end the Commission very earnestly desires your advice and suggestions, in writing, as to the best means of ascertaining all the facts pertinent to the investigation it has been directed by law to make. The Commission particularly desires your carefully formulated views as to what efficient policy, if any, could, or should be adopted by the Government relative to the coal industry, having proper regard to the interests of the mine worker, the mine operator, and the public. Your intimate knowledge of the conditions which at present obtain in the coal mining industry, your recognition of the principle that there should be a "square deal" for all concerned, and your appreciation of the importance of arriving at the earliest possible date at some policy which would insure an uninterrupted and assured supply of coal at a reasonable price to the consumer, will enable you to render a great service to those engaged in the industry itself and to the nation as well by your cooperation with this Commission in carrying out the functions imposed upon it by the law.

In order to put the matter before you in a more concrete form for your consideration there is attached hereto a sheet giving the various topics upon which the law creating this commission requires it to develop facts or make recommendations.

The Commission desires you to go carefully over this list of topics and advise it in writing at your earliest convenience on the following points.

(a) What specific data should be secured under each one of the topics enumerated in the law in order to carry out adequately the direction of the law?

(b) What, in your judgment would be the best and most practicable method for the Commission to adopt for securing these data?

(c) What, if any, topics should the Commission investigate in addition to those already enumerated in the law, in order to give to Congress and the public complete information necessary to the proper understanding of the conditions in the coal industry?

(d) To what extent are you in a position to co-operate with the Commission in securing necessary data in such manner as will eliminate in the largest possible degree any basis for criticism of the accuracy or the validity of the data which have been secured?

In addition to the above the Commission further desires you to advise it in writing at some date in the near future, tentatively:—

(e) What, in your judgment, are the elements that have caused and are causing the acknowledged demoralization in the coal industry, and which are working hardship alike upon the parties engaged in the production of coal and the consuming public?

(f) What, in your judgment, are the practical remedies that would eliminate any or all of the elements that you feel are responsible for the condition?

Respectfully,

John Hayes Hammond

Chairman

LIST OF TOPICS

1. Ownership and titles of the mines; 2. Prices of coal; 3. The organization and persons connected with the coal industry; 4. Cost of production; 5. Profits realized by operators or owners of said mines during the last ten years; 6. Profits of other persons or cooperation having to do with production, distribution or sale of coal; 7. Labor costs; 8. Wages paid; 9. Wage contracts; 10. Irregular production. 11. Waste of coal; 12. and suggestions as to the remedy for the same; 13. Conditions generally under which coal is produced; 14. Distribution.

15. The causes which from time to time induce strikes, thereby depriving interstate carriers of their fuel supply and otherwise interrupting the flow of interstate commerce;

16. and all facts, circumstances, or conditions which would be deemed helpful in determining and establishing a wise and efficient policy by the Government relative to said industry.

17. Standardizing the mines upon the basis of their economic productive capacity and regarding the closing down of mines which by reason of their natural limitations or other conditions, fall below the standard.

18. Ascertaining and standardizing the cost of living for mine workers and the living conditions which must be supplied or afforded in order to surround the workmen with reasonable comforts and standardizing also as far as practicable the amount of work a man shall perform for a reasonable wage, recognizing the value and effect of such surroundings in respect of their efficiency.

19. Standardizing a basis of arriving at the overhead cost of producing and distributing the coal, including delivery at the door of the consumer, recognizing in this compilation that the standardized cost of living to the miners should be the first and irreducible item of expense.

The Mining Districts

BY THE JOURNAL'S CORRESPONDENTS

NORTHERN ONTARIO

PROVINCIAL TAX—It is officially stated that the Government has no idea of increasing the mining tax at the present time. Some who were supposed to know about these things have been greatly concerned the last few weeks over a report that the Government proposed to increase mine taxes on a sliding scale that would bear most heavily on the largest and most profitable mines.

GOLD IN QUEBEC—New discoveries of considerable importance are reported in the Township of Ruyon in the Province of Quebec a short distance East from the Ontario border. A couple of months ago the property known as the Horne Claims was found and optioned to the Thompson-Cadillac interests. Men were sent in to open up this property and although the results were not very encouraging, it did lead to the new discoveries some little distance away. It is understood that the vein has been traced for practically two miles in length, and that where uncovered it shows an average width of about six feet and assays approximately $8.00. As mining claims in Quebec can be staked to embrace 200 acres, it did not take long to blanket this particular discovery and put the claims in the hands of a very few people. A considerable amount of work will be done during the coming winter and the result of operations there will be awaited with keen interest. The discovery appears to be the most important since the discovery of Kirkland Lake.

POWER FOR KIRKLAND—Kirkland mines are still waiting for power, but should receive it some time during the week beginning November 1st. When the power company was able to supply sufficient electricity for pumping and lighting the mines, it seemed better to make a permanent job of repairing the burned sections of the power line rather than to make a temporary job that might give out at any time, and this has necessarily taken longer.

NEW HOIST—Kirkland Gateway has purchased a larger hoist to permit of the increased operations on its property.

BROWNELL—The Brownell has cut its main vein at 600 feet, but no information is yet available as to assays.

OPTIONS DROPPED—The Thompson-Cadillac interests have dropped their options on the Elston-Dunkin and the United Kirkland properties. It is understood that while results were encouraging they were not good enough to justify the heavy cash payments due under the options, and as some delay could not be arranged the options were allowed to lapse.

KING KIRKLAND—The King Kirkland is crosscutting at the 100-foot level in an effort to locate the main vein at this depth.

RICH ASSAYS—The Keeley property in South Lorraine has some remarkable ore and in the new shoot recently discovered the vein in places shows a width of 12 inches and carries up to 15,000 ounces. Production is being maintained at about $80,000 per month, and it is understood that substantial reserves are being blocked out.

VIPONT UTAH—A large part of the revenue of the Kerr Lake Mine comes from the Vipont property in Utah. During the year ending August 31st the latter property produced 997,666 ounces of silver.

NEW VEINS ON PRINCESS—Recent developments of the Princess property by the La Rose have resulted in the discovery of several small veins in territory that hitherto has been practically unprospected.

HOLLINGER—In an effort to cope with the possible shortage of skilled miners, the Hollinger has arranged to bring men out from England, and it is understood that there are now one hundred Cornishmen on the way. Officials of the company announce that no dividend increase will be made this year. This may perhaps be in view of possible power shortage, which would result in curtailed operations and decreased profits. A few days ago a very unusual accident happened at this property. A storage battery locomotive and two cars, one empty and one full of steel, were standing on the 4th level. The operator intended to send the steel car to the steel rack, but apparently must have turned the control the wrong way, and the two cars, with the locomotive behind, shot into the shaft compartment, down which a cage load of men had just descended. Eighteen men were on the cage when the cars and the locomotive went down the shaft, and the surge on the rope caused the safety dogs on the cage to set, fortunately just above the 600-foot level, where they were able to get the men on the station. If the dogs had caught further up the shaft the only way they could have got the men off would be to cut through the side of the cage with acetylene torches. Six men are in the hospital, one with a fractured skull, while all were more or less burned with the solution from the electric storage batteries. Although the locomotive was too large to go on the cage and the two cars went down the shaft ahead of the locomotive, when the wreck was removed it was found that the empty car was on top. As the locomotive fell approximately 200 feet, the shaft was badly damaged as well as the locomotive. It is estimated that the repairs to the locomotive alone will cost approximately $5,000.

DOME—The report of the Dome for the six months ending Sept. 30th shows a profit of $970,000 after large allowances for depreciation of plant, machinery and exhaustion of minerals. Profit compares with $1,215,000 for the entire previous year and shows an increase of approximately 55 per cent. Although a repayment of capital of $1.00 as share was made and the dividend was also doubled to $2.00 a year, the surplus was increased from $215,000 as of March 31st to $712,000 as of Sept. 30th. Call loans are shown at $550,000, bonds at $1,610,000 and cash on hand at $378,000. Reserve for depreciation on plant, machinery and mine exhaustion now stands at $3,000,000, which is over 70 per cent. of the paid up capital. Although the recent profit-sharing pocket was small, it is understood that the ore continues $50.000 a ton.

NEWRAY—Comagas has completed four diamond drill holes on the Newray property, and other holes are under way. No official word has been given regarding the results.

Porcupine Power Shortage.—Unless there is further rainfall in the Porcupine district, the power situation during the coming winter is liable to be serious. The supply of power is already short, and pending the completion of the Sturgeon Falls plant, which will probably be ready in January, no new contracts are being made.

North American Gold Corporation.—One of the latest stock offerings to the public is that of the North American Gold Corporation, with offices in New York. While literature sent out from the company's offices does not actually state that the property is greater than the Hollinger or Dome, it implies that it will be. The literature also implies that the North American Corporation owns the property, but this is not the case, and the public is being asked to put up money not only to buy the property but also to finance a mill. The property comprises what was formerly known as the Ankerite claims in Deloro Township. This property was under option to the Coniagas for a long time, and the Coniagas spent approximately $300,000 in endeavoring to find commercial ore bodies. Although the company had already paid a certain proportion of the purchase price, they did not presumably, consider it worth while, even in the face of the heavy expenditures already made, to complete the purchase and were content to take their loss and let the option drop. The North American Corporation estimates ore reserves of $6,000,000 above the 300-foot level, but in view of the action of the Coniagas management, these figures must be taken with a large grain of salt

BRITISH COLUMBIA

Cariboo.—J. D. Galloway, government mining engineer, thinks that the old Cariboo, the historic gold country of British Columbia, is "coming back". He states that there is gold at Cedar Creek, that it is found on the high benches, seven hundred feet above the present creek level—a most unlikely place to look for the precious metal. One company, with an option on two leases, took out thirty ounces in a day. A steam engine is being installed to pump water from a reservoir for the sluice boxes. Adjacent ground is to be opened up on a large scale and men now are working in preparation for the installation of a plant of considerable size. Mr. Galloway has been supervising some diamond drilling of an exploratory character being carried on by the government on what is known as the Waverley Group of claims.

Usk.—The high benches along Gold Creek, near Usk, northern British Columbia are reported to be yielding gold. Six leases have been recorded and other staking is going on. Two or three companies have taken steps to explore the gold area thoroughly. Gold has been taken from the creek bed for years but the possibility of the benches containing values never before occurred to prospectors.

Rossland.—The last shipment of ore from the I. X. L. Mine, Rossland, which is being operated by a syndicate of local miners, is reported to have brought over $12,000. One car of ore was sent to the smelter.

Molybdenite, Kaslo.—Samples of ore running over $20 a ton in gold and containing a fair amount of molybdenite have been brought to the town of Kaslo by D. Waddams of Johnson's Landing. He says that he already has a carload of this mineral ready for shipment. There is said to be a 12-foot vein.

Kaslo.—The Utica Mines near Kaslo will be taken over by Major H. H. Armstead, a mining engineer of New York. His offer is 7½ cents per share at the end of twelve months, giving the stockholders the alternative of taking stock in the Armstead mine or cash. Major Armstead has lately been identified with a property situated at Talache, Idaho, which under his management now is upon a dividend earning basis. He proposes building up the Utica Mines in the same way, it being his intention to acquire other properties for development simultaneously with the Utica.

Silver Strike.—James Currie reports having struck 14 inches of dry sulphides on Woodberry Creek, carrying values in silver varying from 100 to 950 ounces per ton. Several tons are sacked and ready for shipment.

Slocan Shipments.—A revival in mining throughout the Slocan district is predicted. The Silversmith Mine shipped 700 tons in September and has sufficient ore in sight to continue regular shipments over a long period. The Ruth Mine, now under development, is showing up satisfactorily and the force of men employed is to be materially increased. An important strike is reported to have been made on the Reco. A new lead has been uncovered carrying more of a dry ore than usual, which contains a considerable proportion of grey copper. The Silverite, Black Colt and Carnation are all prospects of promise. A lease had been taken by operators on the dumps of the Sovereign mine, a carload of which material has been shipped. The Noble Five mine at Cody shipped 10 tons of zinc ore in September and is expected to be permanently re-opened in the spring. The Noonday Mine has been opened and expects to ship a carload of ore before winter. The Surprise and American Boy Mines are working under lease. A long tunnel is being driven on the McAllister property and the work will be continued until its objective is reached.

Big Missouri.—Development work on the Big Missouri, Portland Mining Division, Northern B. C., will be continued throughout the winter months. Indications are that it will be possible to commence shipment of ore at an early date. The intention is to transport the material over the trail which was constructed this summer, by double-ended sledge.

Esperanza.—Approximately 100 tons of second-grade ore is being shipped from the Esperanza Mine, Alice Arm to the Granby Smelter.

Boundary.—After more than three years inactivity, the Boundary Red Mountain Co., whose property is practically on the line between the State of Washington, Whatcom County, and the Province of British Columbia, has resumed operations. This property was taken over by Mr. George Wingfield of Nevada, President of the Goldfield Consolidated Mines Co., in 1915. Considerable development work was done with results that led to the installation of a 50-ton mill and an adequate power plant. During 20 months of mill operation extending well into 1917 the gross production amounted to more than $280,000. The work of proving the principal vein from the 200 to the 500ft. level was completed in 1918, opening up large ore reserves. A geological survey recently made has satisfied the management that the ore will continue to greater depth and plans are now under consideration for a new tunnel, 700 ft. below the present 500 ft. level.

Trail Ore Receipts.—Ore receipts at the Trail Smelter, Canadian Consolidate Mining & Smlting Co. for the second week in October were 7565 tons. The shipments

included: Alamo, 151 tons; Black Rock, Northport, Was. 72 tons; Ethiopia, Greenwood 4 tons; Monarch, Field 44 tons; Mountain Chief, Rerata 23 tons; Noble Five, Sandon 92 tons; Paradise, Invermere, 40 tons; Quilp, Republic, Wash. 53 tons; Silversmith, Sandon 199 tons; Surprise Republic, Wash. 54 tons; Silver Hoard, Ainsworth 38 tons; and Company Mines 6853 tons.

Testing Plant For B. C.—The establishment of a plant for the experimental testing of the complex ores of British Columbia has been favorably considered by the Dominion Government. Such an installation, costing approximately $100,000 will be provided for in the estimates at the next session of the Federal Parliament. This has long been agitated for in this province. At present mines operators must send their ores to Ottawa for treatment and the service, it is stated, is far from satisfactory. With a plant engaged on British Columbia minerals exclusively it is thought that information could be more readily obtained as to the best methods to be adopted for the economic treatment of refractory ores of the Kootenay as well as of other mineral bearing sections of the Province.

NOVA SCOTIA

Movement of Coal.—Coal shipments eased up somewhat during the week, affecting some collieries, which had broken time. These were largely in the Glace Bay and Sydney Mines districts. The collieries of Pictou and Cumberland have contracts which will give steady employment to the end of March, 1923.

Car Repairs.—The Trenton Steel Plant is busy on a 500-car repair order from the Canadian National Railways. In repairing the steel cars an average of four tons of new steel is being used and this will further business has made busy times.

Progress Reported at No. 26.—Operations on the large colliery at Dominion No. 26, which for upwards of a year have been held up, have started up and the shaft will be rapidly pushed down to completion. This looks as if "Besco" has sufficient money without having to borrow from New York. Other undertakings on a large scale have been commenced lately.

Wabana Ore Shipments.—The ore shipments from Wabana to Sydney to October were 11,000 tons. An average of 5000 tons of ore was loaded at Wabana piers each day there were operated. Of the amount shipped 4000 tons recently was drawn from the stock piles and 4000 from the mines. Between now and Christmas shipments of ore are from Wabana to Sydney are expected to reach 150,000 tons.

The Employment Question.—As large quantities of limestone will need to supply the Sydney steel plant up to next June have been stocked at Sydney, the Port au Port limestone quarries have been shut down for the winter. Some steady men have been kept on for a month to make contracts ore for next year's operations.

Gold Discoveries in Labrador.—In Newfoundland considerable interest is being shown in the reported gold discoveries at Star Brook, Labrador. Large areas have been taken up by Montreal men and claims are being staked out. As a result quite a great amount of capital will be required to develop. Aeroplanes are said to be in use in connection with the staking up of the claims. In this district the spring is a little late, but the summers are hot. The weather being fairly comfortable for at least six months of the year.

Wabana Ore for Germany.—The October iron ore shipments from Wabana, Newfoundland, to German ports was 102,000 tons. By the end of the shipping season, which comes about Christmas, the quantity of iron ore shipped from these mines to Germany will total 735,000 tons. In the interval 200,000 tons will be shipped to Emden. The freezing up of German ports prevents winter shipments.

Book Reviews

THE MINERAL INDUSTRY DURING 1921. VOL. 30.—edited by G. A. Roush.—McGraw-Hill Book Company, 370 Seventh Avenue, New York.—895 pages. Price, $10.00.

The thirtieth volume of this standard annual work has just reached us. It is, as usual, so compendious and so obviously authoritative that it is beyond the capacity of any but a genius or a specialist to commend it or criticise it; hence a few general observations must suffice in the present case. A scrutiny of the list of forty three contributors to the volume, each one with special knowledge of the mineral he discusses, is sufficient to demonstrate the dependability both as to information and opinions set down, of the book's contents. Mr. Roush has had an eye to head presentation as well as to sound matter, for his book, highly technical as it must necessarily be, is eminently readable.

Canada is represented in the list of contributors by Dr. C. W. Drury of Queen's University, who treats of cobalt, and by Mr. Thomas W. Gibson, Deputy Minister of Mines, Toronto, who reviews the nickel industry.

Canadian mineral production is prominent in several of the sections. The white arsenic production of 1,491 tons from Cobalt ores was, in 1921 one-quarter that of the United States. In former years it has been about one-fifth of the world's total. It is predicted that the annual consumption of arsenic will increase; but there is arsenical ore available to meet any probable demand.

The Quebec asbestos field still dominates the market, though the lower grade blue asbestos of Rhodesia is finding a wider market each year.

The copper production of the United States dwarfs that of any other country. Nevertheless Canada's principal producers are notable, even during the worst year the copper industry has ever had. The Granby plant at Anyox, the Trail smelter and the Sudbury plants yield the respectable total of about 50,000,000 pounds.

In 1921 Canada produced one sixteenth of the world's gold and one twelfth of the world's silver. Ontario's rising production of gold and its steady output of silver are the principal features, while the potentialities of the Portland Canal and Keno Hill districts in the Yukon have begun to loom large.

In the progress of the iron and steel industry [illegible] the most important of all the mineral industries, Canada [illegible] Canada also ran. The success of the Ainsley electric steel furnace, a Canadian development, [illegible] new and promising process for smelting titaniferous ores, also worked out in Canada, [illegible] considered worthy of special note.

In lead and zinc the outstanding [illegible] Mine [illegible] worthy of international attention. The [illegible]

tallurgists who have solved the difficult problem of using the complex Sullivan ore receive special commendation.

"Canadian phlogopite continues to supply most of the world's 'amber mica,' which is preferred for certain electrical uses." The production in 1921 was 700 tons.

Nickel and cobalt, virtually monoplises of Canada's need no special discussion here.

In the resume of progress in ore-dressing and coal washing, the rod mill is discussed at some length, and the economies of its use (not yet fully demonstrated) are mentioned. The re-discovery of the Torrey Cyclone for liberating asbestos fibre from rock is noted. The remarkable progress of selection flotation is discussed. The flotation plant at Nanaimo is the pioneer in the commercial use of this process for cleaning coal.

THE MINES HANDBOOK, 1922—VOL. 15—by Walter Harvey Weed—The Mines Handbook Co., Tuckahoe, N. Y.—pp. 2248. Price $15.00.

The Mines Handbook originated as *The Copper Handbook* by Horace J. Stevens in 1900. Stevens was a noted writer on mining topics and investments and the book was an outgrowth of his work for the technical papers. In a few years time, the book became the standard authority on Copper Statistics and on Copper Mining companies, as Stevens did not hesitate to call a fraud by its right name and to express his frank disapproval of companies organized to sell stock and not for legitimate mine development.

The book has grown from a modest 200 pages, to the 1922 volume of 2400 pages. The original book dealt only with the Copper Industry. The present Mines Handbook covers the entire metal mining field. Carefully compiled and conscientiously edited, analyses of all available information are given for every active company and the opinions expressed are given without bias, fear or favor.

The book contains information about several thousand mining companies, that cannot be found in any other publication. Canada is represented on pages 1691 to 1867, the bulk of the companies listed being, of course, in British Columbia and Ontario. All incorporations that remain uncancelled are given, and consequently the operating mines represent only a small minority of those listed. The discerning reader will find a deal of information, both explicit and implied, in the few lines devoted to each company.

We can heartily commend the work to investors, stock brokers, banks, machinery manufacturers and in fact to all who are interested in the business of metal mining or the value of mining shares.

Advertisements other than "Employment Wanted" or "Employees Wanted" will be inserted in this department at the rate of 20 cents per agate line (14 agate lines make one inch). $2.80 per inch, each insertion, payable in advance. Space measured from rule to rule. When four or more consecutive insertions of the same advertisement are ordered a discount of 25 per cent. will be allowed.

Advertisements of "Wanted Employment" or "Wanted Employees" will be inserted at the rate of two cents a word, net. Cash must accompany order. If box number is used, enclosed ten cents extra for postage in forwarding replies. Minimum charge 50 cents.

CHEMIST, experienced in blast furnace and steel plant work, ores etc., desires position. References. Address Box 521, Canadian Mining Journal, Gardenvale, Que.

INDEX TO MINE AND MILL SUPPLIES

Addresses of advertisers, whose names appear in the following classified index, may be found upon reference to their advertisements. An alphabetical index to advertiserswill be found on the page facing the inside back cover. The following regulations apply to all advertisers:—One-eighthpage, every issue, three headings; one-quarter page, every issue, six headings; one half page, every issue, twelve headings; full page, every issue, twenty-four headings.

Buyers who are unable to find in the classification heregiven such machinery or supplies as they desire are invited to write Service Dept., Canadian Mining Journal, Gardenvale,Que., who can in all probability, refer them to proper sources.

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Mine & Smelter Supply.

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Engineering Equipment Co., Ltd.
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Hull Iron & Steel Foundries, Ltd.
Mine & Smelter Supply.

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Gutta Percha & Rubber, Ltd.

Belting — Silent Chain:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Ltd.,
Jones & Glassco (Regd.).

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Hendrick Manufacturing Co.

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Holman Bros., Ltd.
The William Kennedy & Sons, Ltd.
Peacock Bros., Ltd.

EDITORIAL

There are some subjects with which governments can give assistance, and their assistance is always welcomed; but the mineral industry is one that does not flourish under paternalism, and advice such as has sometimes been offered in this country is not welcomed.

"How small a part of all that we endure
Is that which governments can cause or cure."

W. G. Miller—1910.

WHY PUBLIC SUBVENTION?

We quote today, above, the words of a leader in the mineral industry of Canada whom time has proved to have both sound judgment and prophetic vision. The quotation is apt today on account of a present cry in British Columbia to which it appears to apply with a force equal to that in its original context. The prospective iron ore industry of British Columbia is in danger of being subjected to highly artificial and paternal treatment, such as has been shown often to be in opposition to the genius of British commercial life, and seldom leads to a good and lasting result or maximum benefit to the community that has footed the bills.

British Columbia has coal and plenty of it. For a generation or more, the owners of a number of first class deposits of anthracite on the coast and coastal islands have paid taxes on their properties in the hope that there would be developed a market for it. A number of these owners have expended large sums of money in developing their ore bodies, and are not only willing but anxious to realize on their investment, either by selling ore at a reasonable rate or by selling their holdings. Metallurgical coal is available at tidewater in comparative abundance. Hydro-electric power (if that should be required) is available on the mainland at fairly reasonable rates, though only in quantities that might not be adequate for large electro-metallurgical operations. British Columbians do not lack the initiative that leads to the utilization of natural resources such as these. What is lacking to stimulate their use?

Apparently it is the lack of an adequate market that has deterred all the numerous commercial interests that have investigated the field from investing their money in a Pacific iron and steel plant. The capacity of this market has been ably summarized by Dr. Stansfield in his report to the British Columbia government in 1919. It is merely adequate to absorb the products of an electric smelting plant, but that requires a different dimension from the requirement for a regular blast furnace plant. It has been proposed to include in the market available for a smelter in British Columbia, the western United States; but that is obviously unsound, as it is the avowed and consistent policy of the United States to exclude manufactures from foreign countries as soon as their importation interferes noticeably with domestic manufacture. Similarly there is no substantial prospect of a trans Pacific export market, as the iron and steel production of India, founded upon unsurpassed resources of iron ore and cheap metallurgical coal and labour, has commenced already to demonstrate its ascendancy in that quarter of the globe.

There is no doubt that, if there were a genuine opportunity for lucrative investment in a modern blast furnace and steel plant in British Columbia, one or other of the iron and steel firms that have examined the field during recent years would have seized it. There is likewise no doubt that British Columbians can institute such an industry if they are willing to pay the price. The danger is that specious argument, directed by self-interest, may blind them to the truth and may commit them to a course that will add to their financial burden without the certainty of effecting the end they all desire. If the half million population of the Pacific province were augmented to say, two million (as it will be, no doubt, before the present youth of the province have reached old age) then the risk of public funds in the establishment of an iron and steel industry might well be justified.

Meantime, it seems more reasonable to look for the establishment of the much desired plant by [illegible] more in accord with present conditions. A short time ago it appeared as if the small-scale production of an electric smelting plant might be feasible, and only the unreasonable ability of cheap electric power prevailed [illegible] by Dr. Stansfield. It might well be that a commercially successful electrolytic process will be developed [illegible] comparatively small unit production would suit the needs of British Columbia's scarce population. We believe that until the province's own need is sufficient to warrant the production of an iron and steel plant of the required size, effort will be best expended in the study [illegible] producing iron from its ores that [illegible] accord with all the important factors of the case.

A PUBLIC DUTY

Last week we noted the fact that the coal miners of Alberta and eastern British Columbia have given notice of a further demand from the public in the way of a six-hour day and a five-day week, with a continuance of the present weekly rate of wages. We pointed out that although the public is the owner of the coal seams and, as consumer, is the party principally concerned in the cost of producing the coal, it has not, heretofore, been adequately represented in the councils where wage rates are decided, and will remain unrepresented in the present case unless definite and decided action is taken.

Those who uphold the efficacy of our Arbitration Act to settle disputes must needs confess that, though its provisions have ended many a wages dispute, these settlements have been made almost invariably at the expense of the public. The Act provides for the representation of the interests of employer and employed, and an unbiased third member. The public has no representative instructed to plead its case and protect its interests; hence the public has suffered, and suffered severely.

In the United States, a Commission composed of eminent men of various professions, truly representative of the interests concerned and well qualified to investigate thoroughly and adjudicate fairly, have been left with the coal problem for solution. Whether they will prove to be the exception to the long succession of commissions and committees that have investigated and reported, without avail, only time will tell.

The coal strike in Britain last year was settled by a means that appears, up to the present, to have realized the expectations based upon it more fully than any similar method. The mine operators, faced with the necessity of meeting international competition, tried to reduce prices from their war-time peak. The miners, puffed up by their easily-won victories over the owners in the time of national stress, refused the lower wage. To overcome the impasse, the public, represented by a committee of Parliament, stepped in, and imposed terms that provide a fair rate of return to capital, that give to labour all it can earn and encourage it to further exertion for further gain, and that allows of the gradual and certain rehabilitation of the industrial life of Britain, based as it is to such a marked degree upon the product of the coal mines. This settlement has provided a most clear-cut example of the power of public sentiment, when it is roused to the point of action. It also gives to us Canadians a pointer as to how we can, if we will, adjudicate in our own case.

We, the public, must have a representative in future important industrial disputes. Many of us assume that, since the Industrial Disputes Act is an act of our elected Parliament and is administered by public servants and Ministers of the Crown, we are already adequately represented. The event has proved the contrary. If our Parliament is anything more substantial than the shadow of what it is supposed to be—if it comprises even a modicum of men (including the lady, but excluding those whose self-revealed tendencies place them in a lower category)—then it is capable of presenting our case, and of seeing that our interests are adequately served in the issue. It has been done in Britain and, unless our Canadian parliamentary institution is a farce, it can be done here.

There devolves upon the public, however, a very definite duty. We must let our elected representatives know that we are interested in this coal question—one of the principal concerns of our economic life—and we must give them the mandate without which we cannot expect them to act. The press is the chief instrument to arouse and organize public opinion. Upon the public press, then, rests this duty.

MINING-SHARE QUOTATIONS IN LONDON

On numerous occasions we have referred to the advisability of interesting British capital in the Canadian mineral industry in such a way as would be to the benefit of both. There has been evidence lately that the desirability of this is realized clearly on both sides of the Atlantic. So far, practical expedients have failed to keep pace with the idea. We wish to present here a practical expedient, not new, but capable of application at this time.

A Canadian, prominent in mining affairs, writes: "It is regrettable that, while there are daily quotations of South African mining shares, Australian, and so forth, in London, there are few shares of Canadian mines quoted. The following note is from the *London Mining World* of October 7th, 1922:

> 'The market in Canadian gold-mining shares is mainly confined to the United States and Canada, though our readers are fully aware that it is spreading rapidly to London—almost week by week.'

"There is no doubt that the market for Canadian shares would be much enlarged were there daily quotations of prices. It would be of much advantage to the gold-mining industry in Ontario to have conservative investors in the British Isles purchasing shares."

A scrutiny of a recent listing of Canadian securities in London shows six mining companies in a close-printed page — and one of these six is mis-placed, as it belongs to Colorado, not Canada. Another page of mining shares, representing properties almost exclusively within the British Empire, is graced by two Canadian mines.

At one time there were few, if any, Canadian mines that we could honestly recommend for listing on any well-conducted stock exchange. This is no longer the case. Though there is a multitude of flotations that would disgrace us abroad, as they do at home, we have now a large number of mining companies well worthy of representing the Canadian mining industry in London. Indeed, the affairs of some of our mining companies are so arranged that they give promise of dividends, if not in perpetuity, then as long as many industrial concerns with favoured places on the stock exchanges.

We hope that this matter will receive the attention of those whose concern it is to forward the interests of the best British mining stock exchanges. We are confident that these exchanges and the Canadian mining industry have a mutual interest.

PROFESSIONAL MINING ENGINEERS

Four weeks ago we discussed, under the caption "Institute Membership", the broad question of Institute policy in this important matter, and proposed that the subdivision of professional members, recently instituted and now fairly comprehensive in its membership, be made to serve certain ends of all professional mining engineers, and particularly of those that wish to have a purely professional Institute. Since that time, we have learned something of the origin of this movement within the Institute.

Fifteen years ago, or more, one of the charter members of the Institute, then, as now, one of its most active and most loyal members, and now a past president with an enviable record of service, brought forward this idea of forming a professional section to which only well-qualified engineers could gain admittance. At that time there was being brought to bear on the provincial and federal governments very strong pressure to force the enactment of a professional engineers' bill with exclusive provisions. It was mainly through the efforts of the Institute that this attempt came to naught. Then, as now, the logical alternative was to form a professional society composed exclusively of mining engineers to administer the affairs of the profession. This proposal was not incorporated in the by-laws until 1919, since when our secretary has vigorously put it into effect, so far as enrolment can do it.

But our progress has stopped. We have halted by the wayside. This enrolment is only the first step, and we have still a long way to go. We have now supplied the means to our end: let us effect that end.

Our profession needs regulation, as does any other. We prefer this regulation to be in the form of self regulation, imposed on ourselves by ourselves and by no one else. It is, no doubt, this worthy feeling of independence that has led mining engineers so generally to resist the enactment of a law that would regulate the practice of all branches of engineering. Regulation is necessary, and we have failed to impose it upon ourselves thus far; therefore it behooves us to adopt, without delay, some effective measure.

It is obvious that the logical procedure is to complete the measure inaugurated in the Institute fifteen years ago, formally adopted in 1919, and still waiting to be applied with its full effect. The measure was designed expressly for the object of regulating the practice of mining engineering throughout the Dominion. At present it is a dead letter so far as this, its prime object, is concerned. Meantime the effort and money expended on it are without avail. This is poor sport; let us, at least, get a run for our money.

EDITORIAL NOTES

Today we print a letter from Porcupine that registers a decided objection to our recent rather pessimistic editorial remarks on the forthcoming new report of the district. The writer, who is intimately acquainted with the methods of the field officers of the Ontario Department of Mines and the facilities at their command, predicts a prompt report. We sincerely hope his judgment is correct. It is quite possible that we have over-estimated the magnitude of Mr. Burrows' task and have under-estimated the amount of assistance he will receive from geologists in private employ.

The shortage of unskilled labour in the United States, which becomes more acute week by week, seems likely to spread to Canada. It is already noticeable in some of the mining camps. It is a question how far this shortage can be met under the present immigration regulations. It is likewise doubtfull if unrestricted immigration from Great Britain would provide men able and willing to meet this need.

THE FOURTH ANNUAL GENERAL WESTERN MEETING OF THE CANADIAN INSTITUTE OF MINING AND METALLURGY 1922

PROLEPSIS

Where the Pacific laves Columbia's strand,
(And more than laves when it gets out of hand
There, on the fifteenth instant, hand picked brains
A precious freight, brought in by many trains,
Forgather at Vancouver. Wide, O! wide
The range of talent that will there provide
The feast of reason and the flow of wit.
Cloud-piercing Spike will surely make a hit;
Wilson, the Archimandrite, than whom none
Is fonder in a quiet way of fun
Will fill the chair with grace and with aplomb,
Enforcing discipline as with a bomb.
Kirkpatrick, Brewer, Guernsey, Leckie twain,
Will see to it that things proceed amain
There'll be no lack of stimulating thought
Tricks from the Bible will be played with watch
I have no smallest doubt that rank sedition
Will be the rule respecting prohibition
And now, as ever, when the curtains fall,
The Meeting will be voted best of all!

* * *

One thing I ask before the Meeting closes—
It is that some one rises and proposes
The silent health of those who, now departed,
Courageous, cheerful, ever open hearted,
Kept the lamp burning through the anxious years,
Cherished their faith and straight forgot their fears!

J. C. M.

Placer Deposits of Cedar Creek Area, Cariboo District, British Columbia*

By W. A. JOHNSTON

The discovery in the autumn of 1921 of placer gold near Cedar creek in the Cariboo district, British Columbia, caused a rush of prospectors to the area in the spring of 1922. Considerable prospecting was carried on throughout the area during the spring and early summer in an attempt to extend the known area of placer ground but by mid-summer most of the prospectors, disappointed in their search for gold, had left the area. No important new discoveries were made outside the original area but mining and prospecting in the vicinity of the orriginal discovery resulted in the finding of pay gravels which are much richer and of different character from those originally found. This discovery was made late in the summer and has served to revive interest in the area and to raise the question whether the deposits will not eventually prove to be of considerable importance. The fact that the pay gravels are found at a high level above the present drainage also renders the occurrence of exceptional interest. Few if any similar occurrences were formerly known in the region but if one is established beyond doubt and proves to be of value there seems no reason why others should not be found when the area is thoroughly prospected.

The writer examined and mapped the Cedar Creek area in September, 1922. Acknowledgments are due to Mr. C. Muir, Mr. R. N. Campbell, Mr. E. G. Stevens, Mr. R. Graham, Major M. S. Day and other mining men and prospectors for information regarding placer mining operations and prospecting in the area.

Accessibility of Area

Cedar creek is a small stream flowing into Quesnel lake from the east about 3 miles above the old dam at the foot of the lake. The lake is situated in the south-central part of the well-known Cariboo district of British Columbia. A road, passable for automobiles, runs from Williams Lake station on the Pacific Great Eastern railway to the dam where a townsite, known as Quesnel Dam, is laid out. The road passes through Quesnel Forks at the junction of the North and South Forks of Quesnel river and thence along the north side of the South Fork to Quesnel Dam, the distance from Williams Lake to the Forks being 64 miles and from the Forks to the Dam 7 miles. Another road which ends on the south side of the river at the Dam runs from near Bullion and is shorter than the road via Quesnel Forks, but there is no bridge across the river at the Dam and the Forks road is generally used. Boats are employed for transportation from the Dam to the delta at the mouth of Cedar creek, and a wagon road is being built from the delta up to the mines. A hotel, general store and a number of residences have been built at the Dam and along the shores of the lake, and there are a number of motor boats on the lake.

Physical Features

The topography of the Cedar Creek area is in general similar to that of the Quesnel River and Quesnel Lake districts. The present stream valleys are, for the most part, narrow and deep and steep-sided. Some of the valleys, in their upper parts, are broad and flat-bottomed, and parts of the upland about 1000 feet above the lowest parts of the main valleys are nearly level. This shows that streams formerly flowed at about the level of the upland surface or plateau and that the present valleys have been cut down below the old drainage level, probably because of uplift of the region. In places only small remnants of the old plain-like surface at a high level are preserved; in other places they are quite extensive. Isolated hills and ridges — for example, Spanish mountain, east of the headwaters of Cedar creek, — rise 1000 feet or more above the plateau level. These hills are erosion remnants, and prove that a great thickness of the bedrock has been worn away. The recognition of the old plain-like surface at a high level is of importance in prospecting for placer gold, for it is reasonable to suppose that parts of the channels of the ancient streams would be preserved. It is to be expected, also, that the ancient streams had low gradients and that, therefore, if an ancient stream channel be located its continuation should be looked for at about the same level. A factor, however, which must be considered is that the region was glaciated and, as most of the placer gold was formed before the Glacial period, it is probable that the pay gravels were in part eroded by the ice and became mixed with the glacial drift or were transported by the ice for some distance from their original resting place. The work done in the area is not sufficient to determine what were the effects of glaciation, but glacial drift occurs abundantly from the lake level up to altitudes of at least 3300 feet. It forms a blanket over most of the area and conceals the bedrock except in the canyon of Cedar creek and at a few places on the upland.

A delta and alluvial fan at the mouth of Cedar creek represent the amount of material eroded by Cedar creek since the disappearance of the glacier from Quesnel lake basin. The lower part of the lake trends nearly north and south. It is narrow and straight-sided, except for delta protuberances, and is bounded by slopes which are steeper in their lower than in their upper parts. Some of the stream valleys entering the lake are hanging valleys. Such features are generally considered as characteristic of glacially eroded valleys. Cedar creek, for about 1½ miles up from the delta, is a narrow V-shaped rock gorge. It has a steep gradient amounting to over 600 feet in 1½ miles. In places the gorge is 400 feet deep. In its upper part the creek flows in a broad flat-bottomed valley which extends southeast for several miles and is nearly parallel to the lower part of Quesnel lake. The creek divides in the broad valley, one branch heading in a small pond near the southeast side of the valley and the other extending towards Spanish mountain, which lies between the valley and Spanish lake valley on the east. A broad, nearly flat-topped ridge, forming a remnant of the old plain-like surface, lies between the wide upper part of Cedar creek valley and Quesnel lake on the west. The ridge for a mile or so south of Cedar creek is 900 to 1000 feet above Quesnel lake and is about 100 ft. above the lowest part of the broad

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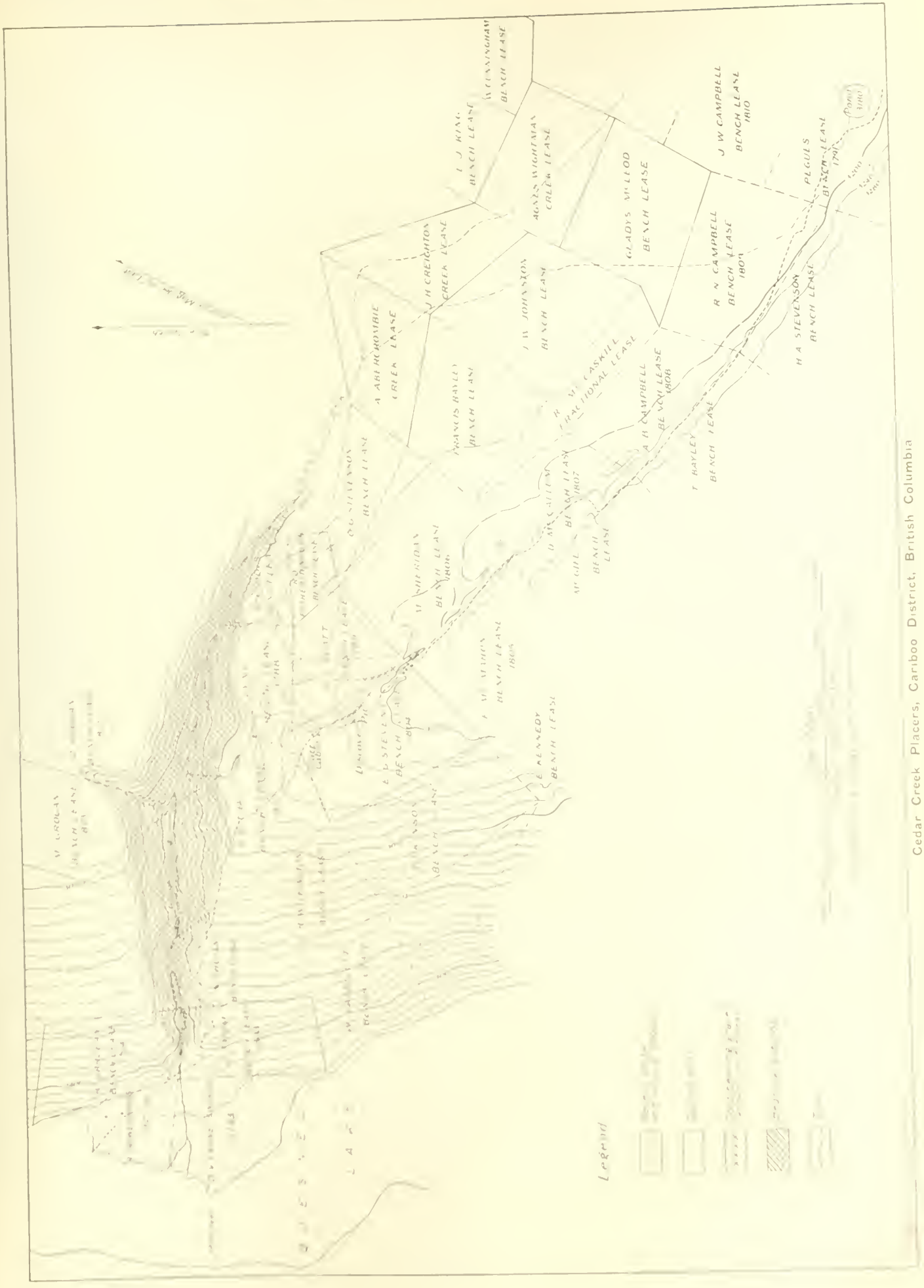
J W CAMPBELL BENCH LEASE 1810
GLADYS McLEOD BENCH LEASE
R N CAMPBELL BENCH LEASE 1809
H A STEVENSON BENCH LEASE
PEGUIS BENCH LEASE
A H CAMPBELL BENCH LEASE 1808
R W CASKILL FRACTIONAL LEASE
T BAYLEY BENCH LEASE
A McMORRIS CREEK LEASE
J H CREIGHTON CREEK LEASE
AGNES WIGHTMAN CREEK LEASE
J H JOHNSON BENCH LEASE
FRANCIS BAYLEY BENCH LEASE
E KENNEDY BENCH LEASE
Legend
Cedar Creek Placers, Cariboo District, British Columbia

valley of Cedar creek on the east. The ridge is about 1 mile from the lake and rises gradually towards the south where is passes into a high hill near where Quesnel lake turns towards the east. North of Cedar creek the summit ridge is somewhat lower and declines towards the north. Small tributaries of Cedar creek, on one of which the discovery of placer gold was made, have low gradients in their upper and very steep gradients in their lower parts. The upper parts of the tributary valleys are mostly shallow trenches in the drift deposits, and have no visible rock rims. They are post-Glacial or Glacial in origin. The great size of the Cedar creek canyon as compared with the delta, and the presence of glacial drift in places on the sides of the canyon, show that the canyon is only partly post-glacial in origin. Amost all the area is heavily timbered and this, together with the covering of drift which largely conceals the bedrock, renders prospecting difficult. Much of the drift is irregularly deposited and the present surface gives scarcely any evidence of the character of the surface of the bedrock. A hill of drift may overlie a depression in the bedrock or vice-versa, and it is only rarely that a depression in the drift indicates an old channel in the bedrock.

actual summit. Since the original discovery, gold-bearing gravels have been found at a number of points for a distance of about 2000 feet along the course of the supposed channel. Practically all the area has been staked, the placer claims consisting of creek and bench leases having a maximum area of 80 acres. Some of the claims and the location of the gold discoveries are shown on the accompanying map.

Mining Operations

Some prospecting and mining were done on the discovery ground and on adjoining properties in the Autumn of 1921 and during the winter, but little was done in the spring of 1922 partly because of litigation. Owing to faulty location on the part of A. E. Platt who staked the discovery ground, the actual discovery proved, when the claims were surveyed, to be on E G. Stevens' claim. The dispute was finally settled by Stevens retaining the ground and receiving half the gold that had been taken out. In April, 1922, six of the original claim owners, E. G. Stevens, F. McMahon, Mike Sheridan, Dan McCallum and the Grogan bros., pooled their interests and later bonded their claims to the Cedar Creek Mining Company Limited of Vancouver of which Mr. F. S. Munson is president and Mr. C. Muir manager. This company began mining operations on July 1 and have employed about 30 men in building a road to bring in machinery, erecting buildings, and in mining and prospecting. Owing to the scarcity of water all the mining has been done with rockers. Two pumps were being brought in during September, the intention being to build storage dams, pump the water up and use it repeatedly for sluicing. Most of the mining by the Cedar Creek Mining Company has been confined to the discovery draw on the Stevens claim but some prospecting has been done on the Sheridan claim. Mining was also carried on during August and September on the Platt claim, in which Mr. R. McCaskill has acquired an interest. Ten men under the direction of Mr. R. N. Campbell were employed and were operating 3 rockers. Here also the water supply was sufficient only for rockers. Prospecting at other places in the area was being carried on by a few individual miners. Numerous prospect pits and shafts, the deepest about 35 feet, have been put down at wide-

Placer Mining, on left bank of Discovery draw, Cedar Creek area, Cariboo, B. C. — The pay gravels are shown in the open cut beneath the fallen stump.

The Discovery

The discovery of placer gold was made by two prospectors, A. E. Platt and John Lynes. It is stated that Lynes was told by John Likely, an old-time prospector of Cariboo now living at Kamloops, that gold had been found in the early days at about the locality where Platt and Lynes made their discovery. Cedar creek itself was mined in the 60's and for many years afterwards but if gold was then known to occur at high levels above the creek the occurrence apparently was not considered to be of importance. The discovery or rediscovery by Platt and Lynes was made in a shallow draw or depression near the head of a small stream flowing into the canyon of Cedar creek from the south and about ½ mile south of Cedar creek. The discovery pit is 910 feet above Quesnel lake and 550 feet above Cedar creek at the point where the tributary creek joins it. It is distant from Cedar creek landing about 1½ miles but is less than a mile in a direct line from the lake. The discovery draw is on the east side of the summit ridge but is only a few feet lower than the

ly separated points, but in many places the ground was found to be deep and as soon as the level of the ground water was reached — usually only a few feet from the surface — the prospectors found they could not control the water, even, in some cases, with the aid of a small pump operated by a gasoline engine.

The Placer Deposits

The placer gold occurs in different ways and varies somewhat in character at different places in the area. In the discovery pit only a small thickness of muck and broken and partly disintegrated bedrock overlies the solid bedrock, the gold occuring in the broken bedrock and in crevices in the solid bedrock. The gold is coarse and nuggety and only slightly worn. Gold has been found at various places in the discovery draw for a distance of about 500 feet down stream from the head. It is mostly on, or in, the bedrock. In places there is an overburden of several feet of barren glacial drift, and where the boulder clay is tight on the bedrock the gold is absent. Several test pits sunk in the lower part of the draw failed to show pay gravels, but a shaft sunk on the left bank just below Platt's cabin showed good values, in gravels beneath or in the boulder clay. The gravels are apparently glacial outwash or reworked ancient stream gravels for they are only slightly weathered. The shaft was sunk to a depth of 13 feet and a drive was run from the bottom for 18 feet into the bank. It is stated by Mr. Muir that good prospects were found both in the shaft, except near the surface, and in the drive. The discovery draw ends abruptly about 800 feet above Platt's cabin at a low ridge of drift 20 feet high. Farther up stream, near the Platt - Stevens line, a small marsh occurs, and here also gold has been found in test pits. On the Platt ground the gold occurs at intervals in a shallow draw in the drift for a distance of about 400 feet. The overburden of glacial drift is 6 to 10 feet deep and the pay gravels are 1 to 5 feet thick. Gold was being mined here in September at the rate of 2 to 3 ounces a rocker per day. The gold is finer than on the discovery ground, the pieces averaging about 6 to the cent. Much of the gold is flattened and worn. The pay gravels are yellowish or red because of the presence in them of oxidized clay. They appear to be, in part at least, re-sorted, probably by glacial waters. Finer gold is found in the surface wash farther down the draw and is probably the result of concentration from the drift by Recent streams. Gold has also been found in test pits in a continuation of the draw into the Sheridan ground. A series of small depressions or channels extend along the north side of the trail leading to the pond, in which one branch of Cedar creek heads. They occur along the slope of the southwest side of the broad upper part of Cedar creek valley and are thought by the prospectors to mark the continuation of the gold-bearing channel. It is evident from a study of the map that a broad channel extends southeast at about the same level as that of the known gold occurrences, so that the supposition of the prospectors is not unreasonable. Small prospects are said to have been obtained at one or two places along the supposed course of the channel above the Sheridan claim but apparently the finds so far are not of importance. It cannot be said however that the area has been thoroughly prospected.

The most important mining development of the summer was the discovery of a body of remarkably rich gravels on the left bank of the discovery draw, about 600 feet above Platt's cabin. The pay gravels rest on bedrock and are overlain by 1 to 10 feet of barren glacial drift and muck. They are reddish owing to the presence in them of clay, which is probably derived from weathering of fragments of the country rock included in the gravels. Most of the gravel is angular, but some worn pebbles occur. No glaciated stones were seen in the gravel. The bedrock is fairly smooth but is soft and easily excavated. It is apparently not glaciated. The pay gravels average about 3 feet in thickness, and were exposed by mining operations for a width of 25 feet and shown by test pits to extend for a distance of at least 70 feet. They appear to trend northwest, and into the bank on the west side of the draw. The gold is well distributed through the gravel and little if any occurs on or in the bedrock. The gold is coarse and only slightly worn. The pieces average perhaps 2 or 3 cents in value but nuggets up to $33\frac{1}{4}$ ounces have been found. These gravels were being mined in September. In the 6 days ending September 23, 351 ounces of gold were produced with two rockers from about 15 yards of gravel. The daily output varied from 28 to 101 oz. This was the best week's output of the season up to September 23. The assay value of the gold varies from $17.05 to $17.16. The assay value of the finer gold from the Platt ground varies from $16.99 to $17.21.

The important points to determine in connection with the recent discovery of rich pay gravels are, first whether the gravels are in place and, second, their probable extent. There is little doubt that the gravels are older than the glacial drift. They appeared to the writer to be in place but this may be open to question. If they are in place they indicate the occurrence of an old stream channel at the level at which they lie. The continuation of the channel therefore should be looked for at about the same level. It is possible, however, that the gravels have been moved to some extent by the glacial ice moving across the region, or that they have been formed by the ice ploughing up the broken bedrock in the bed of an old stream. Little can be said regarding the probable extent of the pay gravels until further prospecting has been done, but there is a possibility, as may be seen from an inspection of the accompanying map, that they may extend for a considerable distance, and they give promise of other discoveries when the region is thoroughly prospected.

Progress in the use of asbestos fibres is continuous. A record, necessarily vague, of a recent invention appears in the current number of *Asbestos*, thus:

Several months ago we predicted that some day someone with an inventive brain would discover a use for Amphibole Asbestos which would mean an extensive use of Amphibole and the making of money by the responsible person.

It looks now as tho that day were dawning. Two men at present very little known to the Asbestos trade, have succeeded in perfecting a binding medium which can be used with Amphibole Asbestos and short grades of clay so-lle, to form a plastic material the uses for which are numerous, and will probably increase as further experimentation is made.

At present we prefer not go into the subject in detail, suffice it to say that the material is proposed to be used for interior decoration, the making of solid moulded articles, and also in connection with paper making or board, kieselguhr products and other substances requiring a binding medium.

Recent Mining Activities in Mayo District, Yukon*

by W. E. COCKFIELD

With the decline in production from the placer gold deposits of Yukon, more attention has been paid to lode mining, as the territory is practically dependent upon its mining industry. For some time past Yukon has been attracting attention as a lode mining centre, particularly in the central portion of the territory, where the location of two large companies in the Mayo district gives promise of the establishment of a lode mining camp.

Location and Access

Mayo district may be defined as that part of Stewart River district for which the town of Mayo acts as a base. Mayo is situated on Stewart River 180 miles above its junction with Yukon River. The confluence of the two rivers is 72 miles south of Dawson. Connection

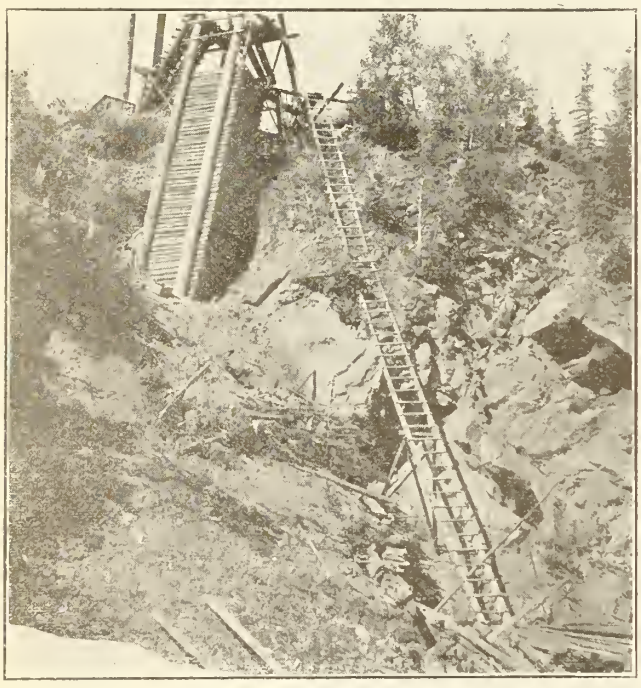

Fig. 1.— Silver King Mine on Galena Creek. The adit forming first level is at the foot of the ladder

with the regular routes between Whitehorse and Dawson is afforded by river steamers during the summer, and by a stage line in the winter. There is also a winter road direct from Dawson to Mayo.

The silver-lead deposits of Mayo district occur along a zone 60 miles or more in length stretching from Mt. Haldane to Beaver river. Recent discoveries show, however, that the limits of this zone are not yet defined, and that it will probably be extended as further work is undertaken.

The deposits are all very much alike in their manner of occurrence. They are veins filling fractures that cut across quartzites, schists, and greenstones, representing the greater part of the bed-rock exposed in the district. These fissures are filled with quartz, siderite, galena, sphalerite, and in some instances tetrahedrite and ruby silver. For a complete description of the veins and various properties the reader is referred to the Summary Report of the Geological Survey for the years 1918 to 1921.

* Published with the permission of the Director of the Geological Survey, Ottawa.

History of The Camp

Although Mayo has been a placer camp since 1898 and the outcroppings of veins of galena were known to the early miners, it appears that the first attempt to mine these veins came about 1912 or 1913 when the Silver King vein, which had been previously staked and subsequently allowed to lapse, was restaked and turned over to two lessees who extracted 59 tons of ore. This ore was shipped to Trail, giving a return of $269 per ton in gold, silver and lead. In 1914 the property changed hands and during the winter of 1914-15 the owners shipped 1180 tons of ore. The property was worked continuously until 1917, when exhaustion of the ore-shoot forced the owners to close down.

In 1918 and 1919 an attempt was made by the Yukon Silver-Lead Mining Co. to mine the deposit at Mt. Haldane. A large amount of development work was done, but failure to find high-grade or shipping ore forced the company to abandon the project after making a shipment of 27 tons of ore for which the smelter returns were 95 ounces of silver and 59% lead.

Recent Development

In the summer of 1919 the deposits on Keno hill were discovered and staked. The Yukon Gold Co. almost immediately took over the original claims. A stampede to the hill followed and within a year upwards of 1500 claims had been staked. A vigorous exploration policy was adopted by the company and in 1920 a subsidiary company, Keno Hill, Ltd., was formed to operate the property. In the winter of 1920-21, 2150 tons of ore assaying 197 ounces of silver and 60% lead were hauled to Mayo to await shipment. At the same time a 100 K. W. steam power plant was erected at Discovery on Duncan Creek, five miles from the mine.

In 1921 Keno Hill Ltd. added to their holdings, acquiring the Friendship group on the western slope of Keno Hill. They erected a second camp on this property and proceeded to prospect it. The company also erected frame buildings on the top of Keno Hill close to their original workings. During the Summer of 1921, two other companies entered the field, the F. W. Bradley interests, and the Slate Creek Mining Co., since organized as the Treadwell Yukon Mining Co. and the Onek Mining Co. respectively. The Treadwell company secured claims adjoining the Friendship group and proceeded to develop the ground by means of two shafts with levels between them. During the winter of 1921

Fig. 2.— First camp of Keno Hill Ltd. The ridge known as Keno Hill in the background.

1922, 3000 tons of ore were shipped. This is expected to run slightly higher in silver than the first shipment.

Progress During 1922

The spring of 1922 found all three companies vigorously prospecting their ground, the main work being done on the original holdings of Keno Hill Ltd., on the Ladue claim of the Treadwell Co., and on the Fisher claim of the Onek Co. A number of individuals were also at work on their claims and some of these have uncovered promising ore bodies. Later in the summer

Fig. 3.—Ore piled at Mayo awaiting shipment.

the Onek Co. closed down and abandoned its options. The other two companies, however, prospected all summer, preparations being made for shipments during the coming winter. Arrangements are being made to handle 7000 tons this winter.

The chief difficulty with which the camp has to contend is lack of cheap transportation. When it is remembered that the ore must be hauled 12 miles to the Stewart River and then transported on river steamers to the mouth of Yukon river and subsequently transferred to ocean going boats for shipment to smelters on the Pacific coast, it cannot be wondered at that only high-grade ore can be mined. All the ore hauled so far has been transported by means of horses and sleds at a cost for the 12 miles of teaming nearly as great as for the rest of the journey. During the coming winter the Treadwell Co. intends to use a tractor in an attempt to reduce their haulage costs.

Promising Field for Prospectors

Outside the actual production of ore, one of the greatest benefits to the camp of the entry of these two companies is the fact that prospecting for lodes has been greatly stimulated and several new finds were reported last summer. Silver-lead ores were found [illegible] valley from Keno Hill and also on Beaver river. While both of these are reported as low grade it may be that with further work high-grade ore shoots may be encountered. In any event, these strikes tend to show that there is still much work for the prospector to do in Mayo district.

While nothing has as yet been found that would point to a sustained production for a long period, sufficient development work has been done to guarantee a production of high-grade ore for several years, and a small quantity of milling ore has been blocked out.

CORRESPONDENCE

Speedy Results Predicted

The Editor,
Canadian Mining Journal,

Sir:

With reference to an editorial appearing in your issue of October 20th., 1922, under title of "Porcupine's Need."

The writer was greatly surprised to see such adverse comment on the work of the Ontario Department of Mines published in the columns of your paper. Incidental to this, such a distortion of the truth together with such a caustic undertone has led me to believe that the C. M. J. Bulletin is essential for the true and just presentation of the facts concerning the Mining Industry of the Dominion and C. M. J. Circular No. 3 of 16.10.22 has been duly filled in accordingly.

When a Canadian Mining periodical implies that it takes "seven long years" for the Ontario Department of Mines to present a report it truly seems time for someone to take the defence, feeble though it is in this instance, of a Department that has rendered such signal service to the Industry as had the Ontario Department of Mines. It is pointed out that with limited staff this Department under the able leadership of Dr. Willet G. Miller has kept pace with Ontario's advance in the Mining Industry and has submitted reports and maps, with the exception of some delayed by the recent printer's strike, within a period of less than twelve months from the date of examination. In support of this it might be cited that during the last few months the Department has published reports on the "would be" coal deposits of Sudbury, Ontario within ten days of examination, and on the promising Lightning River Gold Area within thirty days of the completion of the field work. Can you point out an instance of a similar Department rendering such expedient service to the General Public, or to the Mining Industry? It cannot be done. Then why do you editorially belittle the efforts of a Department so efficiently operated to the mutual advantage of the interested public and the Industry?

A plea for assistants for Mr Burrows has been made. It is one-man job. Perhaps the operating companies do not care to give to "the world" intimate particulars relative to their mines, but these are at one man's disposal for correlation and for the purposes of drawing therefrom such deductions as may aid the legitimate exploitation of untapped promising localities within the camp. The geological re-survey of Porcupine Camp is a one man job, and Mr Burrows [illegible] pointed out in your editorial [illegible] of the younger generation of Canadian [illegible] the man for the job, and [illegible] that the implication that [illegible] Department he represents "seven long years" [illegible] findings public is wholly [illegible] performance of the Department. Let's [illegible] but if the general public and the camp [illegible] within a twelve month from the work of the Ontario Department of Mines, then [illegible] an editorial justifiable is the opinion of [illegible] many others associated with the camp.

Yours, etc.,

[illegible]

Timmins, Ont., November 2nd, 1922.

Vancouver Island Coal

REPORT BY J. D. MACKENZIE AFTER TWO YEARS OF FIELD WORK

"The coal measures of Vancouver Island" is the subject of a report prepared by Dr. J. D. Mackenzie, head of the British Columbia office of the Canadian Geological Survey, who has been engaged in the researches indicated for the past two years. He is of the opinion that the amount of recoverable coal on the Island is considerably below what has been estimated.

He points out that there are three workable coal horizons in the Nanaimo district, and only one in the Comox district, the latter lying over the pre-Cretaceous or barren formation and disturbed by protrusions of the latter in places.

Coal Seams Restricted in Extent

While opinions have differed greatly in the past it was generally supposed that the Lower Wellington, New-Castle and Douglas seams, as occurring in the Nanaimo district, continued for a considerable distance beyond the present known areas. Mr. Mackenzie is of the opinion, however, that they are restricted by contact with pre-Cretaceous formations as they run north towards Cumberland, and that they do not extend far beyond the present workings.

Dr. Mackenzie also emphasizes the importance of the fact that in many submarine mines only 50 per cent. of the coal in the seams is recoverable, due to geological peculiarities, and that seams less than three feet in thickness are of little or no value.

With the experience of two seasons spent in the coal-bearing areas of southern Vancouver Island, and the advantage of extensive diamond-drill prospecting carried on by the coal mining companies of the Nanaimo, Comox and Alberni districts, Dr. Mackenzie has been in a position to make geological calculations with more accuracy than government geologists who have hitherto investigated these coal fields.

Former Geological Investigations

Discovered in 1835 and worked by the Hudson's Bay Company for a time, the coal beds of Vancouver Island were first investigated by the Dominion Geological Survey in 1871, when James Richardson, examining the coal-bearing rocks from Comox to the southern gulf islands, spent parts of five seasons in the field. In 1911 Dr. C. H. Clapp studied the Nanaimo field, and his memoir has since been the basis for many operations there. Dr. Mackenzie has been entrusted with the task of bringing government reports on this area up to date, and he has since carried on extensive research.

Geology of the Coal Measures

"Conditions on the island are those to which geologists give the name of 'progressive overlap,' the significance of which is considerable in regard to the coal resources of Vancouver Island.

"Because of this overlap the coal-bearing horizons of the Nanaimo area are not found north of Nanoose, and for some reason not wholly understood the coal-bearing horizon of the Cumberland area does not contain coal south of Deep Bay.

"Another point the study of these coal measures has brought out is that the coal horizon does not always contain workable coal seams, and that in certain areas seams are so distrubed by deformation that considerable areas have been rendered unworkable.

"After the accumulation of strata forming the northern series, they were folded by earth movements, and the same movements caused an uplift which has subjected these rocks to the influence of erosion. For this reason scores of cubic miles of sediments containing an incalculably large tonnage of coal have been lost by being swept away, and now lie finely distributed over the bottom of the Straits of Georgia.

"Present areas underlain by the Nanaimo series are thus but remnants of a former, much more extensive covering of sedimentary rocks.

"Three principal areas along the southeastern coast of Vancouver Island now underlain by rocks of the Nanaimo series are the Comox area, the Nanaimo area (including the gulf islands), and the Cowichan area. A fourth area underlies the Alberni district, in the interior of the island.

"Coal has been found in workable thickness in portions of Comox and Nanaimo areas, but no workable seams are known in the Cowichan or Alberni areas.

Mineable Coal Formerly Over-estimated

"I have already pointed out that there are only three workable coal horizons in the whole of the 7,000 to 10,000 feet of the Nanaimo series, and that the presence of sedimentary rocks of upper Cretaceous age is of itself by no means a guarantee of the presence of workable coal.

"There are always losses in the mining of coal on Vancouver Island. A certain amount of coal is left in pillars and in seams that are too thin to allow it to be recovered. Some areas are so broken by faults that economical extraction is impossible. In others knobs of the underlying, barren, pre-Cretaceous rocks project through certain portions of the seam, interfering with ventilation as well as with the placing of haulage roads. Considerable areas of coal may be lost by mine fires, excessive gas, water or other causes.

"It is no exaggeration to state that over considerable areas of Vancouver Island there are mines in which scarcely 50 per cent. of the coal actually in the ground has been extracted, because of conditions quite beyond the control of the operators.

"When all these modifying circumstances are taken into consideration it is clear that a figure far short of the 1,340,000,000 tons previously estimated would be nearer the actual coal recoverable from the Nanaimo area.

"A careful examination of the data given by scientists who examined the field in the past shows that the popular interpretation of their statements in relation to the amount of coal recoverable on Southern Vancouver Island is not warranted, but nevertheless the impression of the unlimited nature of the coal of Vancouver Island persists."

Dr. Mackenzie stated that a great amount of prospecting has yet to be done in the Island coal fields. There is, he states, a large area between Courtenay and Campbell River that will require expensive and detailed prospecting.

Letters From Porcupine--I

THE SECOND PHASE

Porcupine is no longer a three-mines camp. Long, perhaps too long, the lesser mines and the undeveloped propects have lain under the shadow of the mighty trinity—Hollinger, McIntyre, and Dome. It has been discouraging both to the small operator and to the claim owner to know that the standards of the camp are set by these three great properties. The trinity, unwittingly, has been a let and a hindrance to the expansion of Porcupine. The public conception of the camp embraces only the three mines. This has been one cause of deferred growth. But there is another related and underlying cause that requires mention.

To protect myself against the imputation of disguised or unfair criticism, let me say at the outset that what I now write has no reference to the Ontario Department of Mines. With this said I feel free to proceed.

Whilst the popular idea that Porcupine consists of three mines has been and continues to be a drawback, it is certain that another cause has deterred mining men themselves from going on boldly with the development of the region. Without hesitation I ascribe the lack of initiative hitherto displayed to the general adoption of a curiously rigid geological formula.

The acceptance of hard and fast geological ideas has retarded the growth of almost every famous mining camp on this continent. A conventional geological theory, once accepted, is hard indeed to dislodge. In its very nature it is restrictive and exclusive. Its exponents resent anything that tends to weaken it. Therefore, any mining property that cannot live up to its exact and exacting specifications is out of the running.

All theories are fallible. At best they are close approximations to the truth. When all facts are known a theory ceases to be a theory. No one will claim that all the facts about the Porcupine ore deposits are known. What is needed, then, is the judiciously open mind. Geological prejudice has had the effect of literally crippling many promising Porcupine prospects. It is gratifying, therefore, to observe the increasing activity of the iconoclast and of the man who follows his own hunch. It is not that the science of geology is being discredited, but that those who arrogate to themselves the right to force geological dogma down unwilling throats are losing ground.

* * *

In discussing this condition with a widely travelled English mining man, he dwelt upon the strong contrast between Porcupine's retarded development, and the rate at which progress would have been made if Porcupine had been discovered in South Africa or Australia. There is assuredly something more than climate to explain away.

* * *

It has been the fashion to look askance upon properties situated outside certain arbitrarily drawn lines. Strangely enough these lines correspond closely to certain township survey lines. Here the home-grown Porcupine fetish, or shibboleth (both words will do) has played its part. In truth and actuality that fetish was overthrown many moons ago; but the public does not know this. Two recent incidents, and many more might be cited, tend to show how completely wrong are current geological prejudices. Of these incidents the first was the discovery of spectacular ore on the Paymaster, in Deloro township, where, also, a good body of milling ore is being developed. The second, of which I have have not yet seen any public announcement, was the discovery on the Rochester of a healthy vein, carrying visible gold, in a cross-cut south under Miller Lake. This is an example of flouting the fetish in its inner sanctuary.

* * *

To those who knew Porcupine in the brisk days when "Ma" Potts was Queen-regnant of Pottsville and all its messuages and purlieus, and "Pa" was the Prince-consort, wholly destitute of executive authority, Timmins and South Porcupine seem obtrusively modern. Up-to-the-minute shops, comfortable hotels, motor cars, radio stations, daily train service, telephone connection with the outside world (beyond New York indeed), bring everything to the commonplace level of city life.

* * *

The intense competition between the representatives of mining machinery firms has many interesting side lights. In the old days "intense competition" would have been too mild a word; what went on then was the bitterest kind of rivalry. Representatives were chosen for their ability to bluff and bull-doze. "Secret" commissions were (it was whispered) the order of the day.

To day the scene has changed. Only men of the highest qualifications, men who know their business in every practical and professional detail and who are able to demonstrate their knowledge, are selected to undertake the frightful task of making a pig-headed mine manager see reason. Tact, forbearance, both only to be acquired by hard experience, are necessary to the task.

In Timmins, at the present time, there is an unusually large number of just such men. To me their zeal and patience are abiding sources of wonder. The mining practice of Porcupine demands the highest quality of equipment. In the matter of hammer drills, for instances, cheap air and high speed of work call for drills that must stand more punishment than would be given anywhere else. This fact has necessitated numberless costly changes in design and in material of construction. Doggedly, and regardless of expense, manufacturers have gone about making trial after trial, until, I suppose the hammer drill, as used in Porcupine, is gradually approaching perfection. It is certainly nearer perfection than it would have been if the mine superintendents had not been such a hard boiled bunch of rock eaters!

* * *

Neither Timmins nor South Porcupine is yet immune from the risk of total obliteration by fire. Just lately it was suggested to me by a friend who knows much more about the country than I do, that at a cost of about fifty dollars per acre, a zone of three miles width surrounding the two towns could be cleared completely and the menace of fire once for all removed. Much of this land could be seeded down with clover, which I am informed will

grow luxuriantly in that soil. Even if this procedure were twice as costly, it would not be too high a premium to pay for insurance of life and property in Canada's greatest mining camp. It strikes me that the initiative lies with the Provincial Government.

* * *

The presence in Timmins of scouts looking round for properties for established mining companies is nothing new. Established companies are notoriously hard dealers. The chances are always 100 to 1 that they will not do business. It is good, therefore, to know that English engineers are on the scene, looking round quietly for legitimate ventures, not for the "sure thing" that Canadian scouts seem to expect to acquire for next to nothing.

God forbid that we should witness a boom in Porcupine. It is not needed. The profiteers of the stock exchanges would be sole beneficiaries. But it is most manifest that Porcupine has cast off the swadding clothes of infancy. They haven't fitted well for a long time. In fact the assumption of the toga may follow (unconformably) the casting off of infantile integuments.

J. C. MURRAY

News and Comments

BY ALEXANDER GRAY

The Banker Makes Acknowledgement

It is almost sensational to have the Royal Bank of Canada—one of the greatest credit institutions—in its November bulletin remark of Northern Ontario mineral developments in this strain:

> "During the past two years, the mineral output of the Dominion was valued at $237,400,000 and $172,300,000 respectively. Toward these totals, the largest contribution was made by the gold and silver mines of Northern Ontario, which, during recent months, have shown greatly increased activity. It would be easy to underestimate the importance of these rapidly developing industries in the commercial life of the province, and, in fact, of the entire country.
>
> "During the month of August, gold from the Kirkland and Porcupine districts amounted in value to approximately $1,820,000. The production of gold for the first half of 1922 shows a large increase over that of any similar period, and gives promise of an output exceeding $20,000,000 in value, for the year, in comparison with $14,624,085 for 1921."

Those are handsome admissions, handsomely made. Mineral industries are conceded to be a factor in the economic existence of the Dominion. Banks have a rule that precious metal securities, however strongly "backed," cannot be entertained as collateral. They are prepared to lend on behalf of coal and iron mines, but the precious metals are altogether "too utterly too-too!" To a certainty, it would be more than an indiscretion for banks to carry the generality of script, even if the discounting and interest were usurious; yet there is satisfaction in having the Royal Bank pass the bon-bon dish. Sir Edmund Walker and his Adjutant, Logan, have devoted space and praise to mineral industries. Indeed, more than one bank has lost very useful accounts because they declined to concede what the Royal Bank admits. Of course it might be necessary for banks to retain a technical staff; but that would be no more than now obtains in the United States, where a Mining Engineer is an essential part of administration. At any rate, the Royal Bank has thrown this picture upon the screen.

> "The production of silver also has shown a very rapid development during recent months, in the mining listricts of Northern Ontario. During August 850,000 ounces were produced in the Cobalt, South Lorrain and Gowganda districts. The production of silver for the first half of the year shows an increase in volume of 720,000 ounces, over the same period a year ago."

Nor is that all the Royal Bank has to say. Its November bulletin was the more comprehensive in its appreciation of mineral industries, by incorporating this:

> "Certain of the mineral products of Canada are of special interest, in view of the large percentage of the world's supply of raw material which Canada possesses. Nickel and Asbestos are virtually Canadian monopolies. Of the former, Ontario mines produce more than 80 per cent. of the world's output, and, of the latter, the Province of Quebec produces the same percentage of the world's total."

All the more reason why more banking utterances should bear upon these matters. The banker has the say, and properly so. He may not understand that the Quebec Asbestos Industry has rivals. There are competitive metals in the Nickel field, and slow markets for Nickel and its alloys. Therefore, bankers and politicians and statesmen—if you will—can be helpful—if they will.

"Tom" Moore's Diatribe

As a Canadian delegate to the International Labor Congress, "Tom" Moore (who lacks the poetry of his namesake) has been spouting in London about "the hardships of mining and the impoverished conditions prevailing among miners in Northern Ontario." He warns "Cousin Jacks" not to come here for $3 a day. Moore speaks as a "mucker." He is unskilled as a miner(with other than his mouth) and that will be understood by Cornishmen and others familiar with the wage schedules obtaining in Ontario. Such as he would cripple industry. Claptrap of this sort is what makes it all the more surprising why willing-to-works (at excellent wages) are stopped by Ottawa regulations.

Why "Guarantees"?

The London correspondent of the "Montreal Gazette" voices the resentment of the backers of the proposed British Columbia Steel Industry, who met with opposition in their endeavors to have the Imperial Government guarantee a debenture issue that would be a first charge on the undertaking. He appears to join in placing the blame upon "Eastern Canadian Capita-

lists," who also, it seems, "crabbed" the Humber River hydro-electric scheme in Newfoundland, although "British papermakers" threw a few monkey-wrenches at the Newfoundland project. Undoubtedly we would all congratulate promoters of anything, anywhere, if they could have their legitimate and praiseworthy plans lubricated by any government; but those not so favored naturally rise to remark that they should have their helping while the fiscal "oats" are available. We have had a Nickel experience of this sort!

The Curtain for Knight Central

At first blush it may be incomprehensible why the cables announced the closing down of the Knight Central Mine at the Witwatersrand. The exhaustion of a mine is not considered a universal event. Ordinarily it would occasion local regret and few flowers. But the name of "Jim" Knight is emblazoned upon the Rand escutcheon along with those of John Charlton, Simmer, Robinson, Ferreira, Bantjes, and the others who staked early. "Jim" Knight, moreover, bequeathed a daughter to Canada in the person of Mrs. Machin, wife of the persistent patron of the Mikado-Sultana section of Ontario. Several "Knights" were incorporated on the near east Rand. "Jim" got his share of the perquisites.

Knight Central was formed twenty-seven years ago; shaft-sinking began in 1896, and the main reef was struck in 1899 at approximately 2,000 feet. The cash capital altogether invested in the property to date amounted to about £1,100,000. The Boer War intervened. Since milling began in 1909, nearly 3,900,000 tons were crushed for a gold yield of about £4,100,000 at a cost of almost £1,050,000. The working profit, interest and sundry additional revenue totalled some £600,000, so that did not enrich shareholders in general. There remains a small tonnage to be salvaged. Anyhow "Jim" Knight and the "Knights" have their place in history; and those who knew him might not have known, were it not for the cables, that Knight Central has "passed in its checks."

"Toronto Telegram" Perceptage

Commenting on the glutted state of the Toronto "Mining" stock market, the *Telegram* fears acute indigestion before Spring and therefore advises all that one in three hundred "prospects" have a chance, so no one should put money into such ventures without being able to lose it. How the calculation was arrived at is the business of the *Telegram*. Undoubtedly the persistence of the Appeals to the public for loose change amounting to a great deal in the aggregate has left the speculative position decidedly waterlogged. That however, does not affect the fact that the "also rans" in any competition never get in the money. So long as newspapers give space to the racy, tag and bob-tail stuff and do not sometimes credit by censoring reckless statements, the chances are as one to three hundred. But advertising demonstrates have established that ratio—not the mineral deposits.

Dome Mines Recapitalization

Dome Mines shares of no par value, for each share of $20 parity, as what is announced from New York. As the outstanding capital is 176,667 shares that are valued in the market at $21,920,682, or so, it is quite obvious the price had become "unwieldy". Under the new arrangement the redemption of capital hardly will proceed so rapidly. Incidentally, Mr. Howard Pelton resigned from the directorate. He may not be the most diplomatic conversationalist, but he has the faculty of "speaking his piece"—and that is an asset. As the partner of Herbert Poirier, the firm of Pelton and Poirier has won a permanent place in the North Country. They are mining engineers who rendered distinctive service without sacrificing popularity—which is "saying some thing" in mining. It is the sincere wish of those who have faith in the Northland that Messrs. Pelton and Poirier will retain that technical relationship, which will be helpful as it has been profitable.

Scouting British Columbia

It is informative to have it from reliable sources that Butte interests have had formidable parties in the Pacific Coast country during the past Summer. As many as seventeen are said to have been giving British Columbia, Alaska and the Yukon, the "once over". Entry of the Guggenheims and others into Portland Canal and the Mayo district and the success attending Premier Mine operations are largely responsible. Concededly the localities call for capital. In the near future undoubtedly there will be more capital available, notwithstanding the factor of inaccessibility. When it is necessary to resort to early Mexican selective mining, as is the case in the Mayo district, nothing but very high grade being commercially profitable, it calls for no elaboration to make it clear that the past ten years have been really for prospectors. The race goes to the strong. Experienced operators are getting the best there is, and leaving the other until economies are attainable. The Premier and affiliated companies are establishing their section. Messrs. Thomson & Doheny of Montreal have had a successful year in Alaska, and, if they read aright the signs, next year will be better. Mr. W. P. Alderson, who has just returned from there, reports in the most optimistic way of the country, despite operating handicaps. And as for creature comforts, Mr. Alderson lived on moose, caribou, venison, mountain sheep, partridge, grouse, salmon and trout until he dislikes to revert to common-or-garden fare. When one steamer on the Yukon was delayed for three hours by caribou the varieties outweigh adversities. Besides, Mr. Alderson is venomous as well as voracious, when it comes to game and game hunting.

Development work is now under way on asbestos claims in British Columbia located on Mount Spratt, 24 miles south of Revelstoke. These claims are located at an elevation of 1,200 feet above sea level and about 2,800 feet above the nearest railway. The location of the claims, necessitating the expenditure of a considerable amount of capital to bring them to a profitable producing stage, is said to be the only obstacle to their rapid development.

The Yukon's gold output [illegible] million and three-quarter ounces. Dredging [illegible] along the creeks beyond the usual period [illegible] unusually mild autumn and the gold production [illegible] increased correspondingly. Hydraulic mining [illegible] were shut down a few days [illegible] still throughout the gold creeks. The [illegible] from Mayo dropped to date [illegible]

Preservative Treatment of Mine Timber

BY TREATMENT THE AVERAGE LIFE OF TIMBERS UNDERGROUND, NOT SUBJECT TO WEAR, IS INCREASED FROM SIX OR EIGHT YEARS TO LONGER THAN THE LIFE OF THE AVERAGE PROFITABLE MINE

Preservation of mine timbers by treatment, first as a conservation measure necessitated by the rapidly decreasing supply available on the North American continent due to the enormous and ever increasing consumption, second in the interests of economy by treating against decay, is urged by R. R. Hornor in his report of an investigation instituted under the auspices of the U. S. Bureau of Mines.

Mine timbers, the report states, are destroyed by four principal agents—decay, insects, fire and mechanical abrasion. Of these, decay and insect attack are by far the most important. The amount of mine timber destroyed by these different agencies varies greatly with the conditions in the mines, and depends largely upon the character of the deposit, and method employed in mining it. In general more than 50 per cent of the timber used in the mines is destroyed by decay and insect attack, but perhaps not more than 15 per cent of the total is subject to replacement, that is, where the working place will be kept open longer than the natural life of the timber.

Timber conservation may be accomplished in part by the better selection, preparation and storage of timber intended for mine consumption, but the most effective means is by treating the timber, to prevent decay, with some standard preservative before it is placed in the mine. It is needless to point out that only those timbers should be treated that will be used in working places which are to be maintained for a period of years sufficiently in excess of the natural life of the timber to warrant the use of treated timber. Neither should treated timber be nesd in places where it would be subjected to destruction by crushing rather than by decay.

It is estimated that on an average possibly 85 per cent of all the timber employed annually in the mines of the North American continent is used in working places of only temporary nature, such as rooms in coal mines and stopes in metal mines that will shortly be worked out and abandoned. Much of this timber is destroyed by crushing or covered up by waste rock and is of no further service. Even where subjected to decay, its natural life is usually greater than its mechanical life, therefore preservative treatment would not be justified. The only practical means of reducing the quantity of timber used in this manner would be to either modify the existing system of mining or adopt an entirely different system wherein less timber is required.

Average Life Three Years

Of the enormous total of approximately 293,000,000 cubic feet of timber consumed annually in American mines it may be safely estimated that an average of 15 per cent. or 43,950,000 cubic ft., is used in underground haulage ways, airways, and other openings of a more or less permanent character where the timber is largely destroyed by decay. Experience has shown that the average life of mine timber in permanent openings, where it is not subject to crushing, is about 3 years, but often under conditions unusually favorable to decay the life will not exceed one year. On the assumption that the average mine shaft, tunnel drift, and gangway, will be in service for a period of 12 years, the timber supports will be renewed at least three times, and under some conditions five to ten times. If the minimum figure is taken the quantity of timber consumed during the 12-year period is 175,800,000 cubic feet, of which 131,850,000 cubic feet might have been saved had the original timbers been given a preservative treatment. If the average cost of the timber be taken at 25 cents per cubic foot, the saving in timber alone would $32,962,500. The labor cost in replacing would be equal to and in many instances much more than the cost of the timber. It is obvious, therefore, that by treating timber to prolong its life the annual saving in cost of labor and timber will be large.

In the foregoing estimate of the annual consumption and value of mine timber no account was taken of the relatively large quantity of timber used in surface construction. Unfortunately, no data are available upon which to base even an approximate estimate of the quantity of timber thus used. Obviously, however, the quantity is large as may be appreciated by citing some of its many uses.

The principal surface structures built wholly or in part of wood are head-frames, shaft houses, breakers, tipples, tramways, ore bins, coal bunkers, trestles, flumes, concentrating mills, stamp mills and mine buildings- timber framing and carpenter shops, blacksmith shops, machine shops, power houses, change houses, and supply houses. In addition, an important amount of lumber and dimension timber is used in miscellaneous mine and mill equipment such as mine cars and trucks, tanks, launders, conduits, concentrating tables, jigs, flotation machines, classifiers, battery blocks, foundation timbers, etc. These structures and equipment require constant repairs and replacements, of which perhaps 80 per cent. or more, is caused by decay and could be largely avoided if the original timber were given a preservative treatment.

Treatment Effects Important Saving

The average life of untreated wooden surface structures is placed at 10 to 12 years; but the average life of timber entering into mine and mill equipment subjected to replacement from decay is probably not over 6 to 8 years. Assuming the average period of usefulness of all kinds of mine construction is 20 years, then the timber subjected to decay will require replacement at least once during its period of service in the case of surface structures, and twice in case of mine and mill equipment

With proper preservative treatment of the original timber entering into this construction, it would be made to last throughout the entire period of ser-

vice, thus effecting an important saving in the cost of material and labor.

To determine the advisability and economy of treating underground timber, also timber used in surface structures and equipment, Barth formulated a rule which is substantially as follows: Timber that is permanent in character and which is not exposed to destruction by mechanical wear or crushing before the expiration of its natural life, or the usefulness of which does not cease before the advantages of chemical preservation can be realized, should be treated.

Book Reviews

A. S. T. M. TENTATIVE STANDARDS—1922.—American Society for Testing Materials—1315 Spruce St., Philadelphia, Pa. paper $7.00, cloth, $8.00. pp. 774.

This annual volume, which is of increasing importance to the engineers of this continent, is just off the press. The volume for 1922 contains 163 Tentative Standards, as follows:—

18	relating to	Steel, Wrought and Cast Iron.
13	"	Non Ferrous Metals.
27	"	Cement, Lime, Gypsum and Clay Products.
15	"	Preservative Coatings.
13	"	Petroleum Products and Lubricants.
35	"	Road Materials.
4	"	Coal and Coke.
9	"	Waterproofing.
5	"	Insulating Materials.
4	"	Shipping Containers.
12	"	Rubber Products.
4	"	Textile Materials.
4	"	Miscellaneous.

The term "Tentative Standard" is used to distinguish a proposed standard, issued for general criticism and subject to amendment for a period of two years or more.

The A. S. T. M. is performing a notable service for both the United States and Canada. Our own Canadian society, composed likewise of members doing voluntary service for the general good, can be coupled with the American organization in our hearty commendation and appreciation of their good work.

BELT CONVEYORS AND BELT ELEVATORS—by Frederic V. Hetzel—John Wiley & Sons, New York. Renouf Publishing Co., Montreal—333 pages, illustrated—$5.00 post paid.

"This is intended to be a practical book. It is not a mere re-statement of what already appears in trade advertisements, nor does it contain descriptions of installations of conveying and elevating machinery. It aims rather to explain principles and the reasons for doing things." So says the author in the preface, of this eminently practical treatise. It not only explains in great detail the principles concerned, but presents the means of applying them. The 58 tables of various sorts interspersed throughout the text illustrate this fact, giving the strength and weights of materials, standard comparative dimensions, horse-power and capacity, standard parts, calculation of stresses, etc.

The miner and metallurgist usually have a direct concern, and often a vital concern with belt conveyors and elevators. Few mills, or even crushing plants, can do without them. Those who wish to acquire a thorough knowledge of such mechanisms can do so conveniently and at the expense of a minimum of effort with the aid of Mr. Hetzel's book.

CEMENTS, LIMES AND PLASTERS—by Edwin C. Eckel—Second edition 1922—John Wiley & Sons, New York; Renouf Publishing Co., Montreal—670 pages, illustrated.—$6.50, post paid.

Mr. Eckel is one of the most lucid and thorough of contemporary technical writers. Mining engineers who have read his "*Iron Ores: their Occurrence, Valuation and Control*", 1914 and "*Coal Iron and War: a Study in Industrialism, Past and Future*", know already the masterly style in which he is accustomed to treat his subject. The present work, extensively revised from the original edition of 1905, is compendious in its scope and thorough in its treatment.

"Of all the non-metallic structural materials in use by the engineer, the most important at the present time are those included under the head of Cementing Materials, using that term in its broadest sense to include not only the hydraulic cements proper, but the lime, plasters and allied materials." This statement from the preface provides the thesis. These are treated in succession gypsum, lime, magnesia, hydraulic limes, natural cements, Portland cement and Puzzolan cements, the last being made mainly, on this continent, from blast furnace slag. The constitution, properties, geological occurrence and process of manufacture of each of these is described in succession. As the scope of the work is so widely inclusive, no one subject can be treated exhaustively in detail; hence very complete lists of references are given at the end of each principal section. As in natural and logical, the discussion of Portland cement occupies a large part of the volume.

Though the book is concerned principally with the industry in the United States, Canada comes in for a fair share of notice, particularly in the discussion of deposits of gypsum and magnesite, as these minerals are at present mined in Canada chiefly for export to the United States.

This work is, no doubt, to a great extent technical in interest the specialist may be inclined to think. It will be found, however, a wide ranging book which will give a general and accurate knowledge of the subject and this new edition will prolong its usefulness for a long period of years.

Advices from Duesseldorf, Germany, state that a contract has been negotiated by [illegible] Assembly Corporation and steel companies with the Dominion Iron & Steel Corporation of Sydney, N.S., for a large tonnage of iron ore. So far as the contract has been announced it is as follows: The ore will be mined in Newfoundland [illegible] coastal freighters carrying the ore.

The production of [illegible] has increased from [illegible] more than [illegible]

During the first half of 1922 [illegible] of Canada was [illegible] Mexico was [illegible]

The Mining Districts

BY THE JOURNAL'S CORRESPONDENTS

NORTHERN ONTARIO

An Offer to Buy—Kirkland Lake Proprietary directors have circularized the shareholders, advising them that they have been approached by an influential group of Americans, who have important holdings in Northern Ontario, with a view to the consolidation of interests. No details are given, but the directors wish to be advised of the general attitude of the shareholders in order to decide whether or not to proceed with negotiations. It is generally understood that the group mentioned are those behind the Continental Mines, Limited. The latter company has large holdings in Kirkland adjoining and lying to the east of the Tough-Oakes. An amalgamation with the Proprietary holdings would give them a substantial mining plant and mill and enable them to get on a producing basis immediately, pending the development of the large area of unexplored ground that the Continental now owns. The directors advise that the recent discovery at the Tough-Oakes has been so satisfactory that there seems to be a reasonbale assurance of continuous dividends being paid. On the new vein recently discovered fifty feet of driving has shown an average of $28.80 over 56 inches. Under these circumstances the directors hesitate to assume the responsibility for negotiating without a definite indication of the opinion of the shareholders.

Power on Again—Matabitchouan power was turned on Kirkland Lake on November 3rd, and mills in the camp have again started operations.

Milling at Ontario-Kirkland—Directors of the Montreal-Ontario announce that milling operations will be started immediately. The above company consists of an amalgamation of the Ontario-Kirkland and the Montreal-Kirkland. The Ontario-Kirkland is developed to a depth of 450 feet and is equipped with a mill having a daily capacity of between 150 and 200 tons. It was generally understood that ore reserves were substantial and a grade sufficient to permit of continuous operation. When the mill was started, however, it was found that the ore only averaged about $2.50 per ton. Being rather short of cash, it was not long before the company was forced to close down. Subsequently it was amalgamated with the Montreal-Kirkland, which undertook to assume the outstanding liabilities. A new manager has recently been appointed to the property, and he states that the average value of the main vein was approximately $9.00 per ton, and that this value has been proved over several sections on the 450-foot level. He states, however, that in the former stoping operations, dilution was so great that it accounts for the low grade that went to the mill. He states that the mine is capable of producing 100 tons per day of $8.00 ore from the 450-foot level, from which it is estimated that a profit of approximately $2.00 a ton can be made. The old Ontario-Kirkland was the one big disappointment of the Kirkland camp, and while it is very doubtful if it can "stage a come-back", such an eventuality would do more than anything else in greatly increasing development along the south "break" upon which the property is situated.

Bidgood—The Bidgood has cut its vein on the 600-foot level, but it is understood that the values are low. It is not expected, however, that the best part of the vein will be developed before another month.

Stellar—Nipissing has started a third diamond-drill hole on the Stellar claim in Kirkland. The first two holes cut several fractures, but it is understood that the values were low.

Good Year for Coniagas—Coniagas' fiscal year ended October 31st, and it is stated that results were quite satisfactory, although the profits will be lower than for the preceding year. While the production in ounces was approximately the same, the tonnage treated was greater and the average silver content was lower. The Coniagas has rebuilt the mining plant on the Ruby, destroyed in the recent big fire, and has resumed underground work there.

Prospective Offer for Peterson Lake—Peterson Lake directors aore sending out circulars to shareholders asking them to join with the directors in selling control to a large Cobalt company, at 25 cents a share. It is understood that this is in order to meet the requirements of the prospective purchasers and that negotiations are by no means concluded. The President of the Peterson Lake states that he expects the results of the October operations on tailing retreatment will show a good profit.

Farah Prospect—The Mining Corporation has taken a lease on the Farah property in Cobalt, and has started a small gang to work.

Abitibi—The Abitibi Gold Mines will proceed at once with the development of its claims in Lightning River. A plant will be taken as soon as the winter roads are in shape, and a shaft sunk to a depth of 100 feet. According to the recent geological report of Mr. Knight, the property has an encouraging surface showing.

Lightning River—It is understood that the Lightning River Gold Mines has disposed of a large block of treasury stock to Toronto interests, and that when this money is received, underground development work will be proceeded with immediately.

Miners from England—110 Cornish miners have arrived in Porcupine to work at the Hollinger Gold Mines. There are a large number of idle miners in Cornwall and picked men are being brought out to fill the shortage which is expected to arise in the gold mines of Northern Ontario. The bringing in of these men does not appear to meet with favor from Mr. Tom Moore, President of the Canadian Trades and Labor Congress. He is credited with having made a number of ridiculous remarks regarding rate of wages and conditions of employment, and in one of the labor papers gives an interview in which he states that at the present time unemployment is rife and that it is a question if any of the men being brought in would get more than $2.50 a day. The facts are, however, that there is plenty of employment for good men in the mines, and that the minimum scale of wages in Porcupine in $4.24 a day. Miners receive $4.80 a day, and as a good deal of the work is done on contract, a great many of them will be able to make considerably more than this.

NOVA SCOTIA

RECORD AT STEEL PLANT—General Superintendent Bischoff of the steel works at Sydney complimented the heads of the departments the other day on the new high records during the month of October. They were the highest in the history of the works. Mr. Bischoff took occasion to turn the attention of his assistants to the accident list and asked them to begin a campaign for a lower accident rate. He reviewed the work of the safety department, and stated the number of accidents in September and the cost to the Company for compensation claims during the year, which were very large. He pointed out that while twenty-five per cent. of the accidents can be prevented by safety guards, the other seventy-five per cent. could only be prevented by education.

OUTLOOK FOR WINTER TRADE—President Roy Wolvin and vice-president D. H. MacDougall spent several days in the Sydney and Glace Bay districts inspecting the steel and coal plants. While the President gave out very little for publication, we know that he was optimistic on the coal and steel outlook. Indications point to some success by the President in his effort toward financing in the United States, and it is well understood that the British Empire Steel Corporation can take care of all necessary development to increase both the steel and coal outputs, especially the latter. One thing is assured, and that is a busy coal trade during the coming winter.

MORE PIG IRON—A third blast furnace will be blown in at Sydney shortly and probably a fourth about the begining of the year.

STEEL DEMONSTRATOR—Mr. G. Wheeler, of Warren, Pa., a well known scientific steel demostrator, visited the Sydney plant and made tests of rail steel in the matter of hardening and tempering. The demonstrations were of a varied nature and showed the possibility of working up into various steels the rail steel now produced by the company.

BRITISH COLUMBIA

SILVER NEAR NELSON—High grade silver ore is reported to have been found on Canyon Creek, near Nelson. A sample, states the owner, James Cummerford, gave returns equal to $2,000 a ton in silver and several dollars in gold. About five tons of this ore is ready for shipment. The property is situated at an altitude of 8,000 feet.

SILVERSMITH—Reports just issued for the benefit of stockholders state that the Silversmith Mine, Sandon, for the period of June 1st to Sept. 30th of this year made a net profit of $83,350.57. There have been many improvements to the plant and much development in connection with the property. The flotation plant has been perfected and a 200 h.p. Diesel engine is being installed as an auxiliary unit to furnish additional power during the winter months. A heating plant for the mill and adjacent buildings has been installed as well as an American filter and zinc buns. There are, besides, a machine and blacksmith shop as well as an assay office and additional settling tanks. One hundred men are employed. The Company milled 3149 tons of ore assaying 21.75 ozs silver, 8.6% lead and 6.2% zinc during the month of June. Production averaged about the same over the succeeding months up to and including September. It is stated that accurate figures cannot now be given as to the number of tons of zinc concentrate on hand, but the tonnage is placed roughly at 2000 which is additional to the output for the four months referred to. The value of the crude lead and zinc concentrates after deduction of freight and treatment costs, it is thought, should amount to $272,338.29. From this, however, must be deducted operating expenses, royalty to the Minerals Separation North American Corporation on flotation concentrate; also a sum for depletion and depreciation. Additional reserves are being opened up. The report concludes with the statement that with a profit of over $83,000 in the period under review, shareholders may now look forward to quarterly dividends. Oscar V. White is the manager of the property.

CARIBOO—Thomas Drummond has commenced placer mining operations on Hemlock Creek, east of Cedar Creek. He installed a flume and although water from this source was available for but a few days, was able to clean up, it is stated, about $2000. Hydraulic work will be carried on more extensively next season.

GEOLOGIST REPORTS DISCOVERIES—Dr. C. R. Cairnes, of the Canadian Geological Survey, has returned after spending the summer in the Yale and Similkameen Mining Districts. He states that there are several promising low-grade copper and gold properties and a number of higher grade silver-lead prospects in that section. Among mining properties examined was that of Summit Camp at the head of the Tulameen River which is an old mine on which some development has been done. Very little ore has been shipped, however, owing to transportation difficulties. With the improvement of the road from Tulameen Village on the one side and Coquihalla Valley on the other there is every chance of the opening of properties of considerable importance. Dr. Cairnes says that there are a number of properties in the vicinity of the Nickel Plate mine, the ore of which is of much the same character as that of the latter and which may be developed in the near future.

PEACE RIVER DRILLING BRINGS GAS—Recent reports from the British Columbia section of the Peace River country indicate that three companies have been drilling for oil during the past season. The Imperial Oil Co. is still at work in the vicinity of the town of Rolla and is down about 2700 feet. At this point there is a strong flow of gas which now has been piped off. Accidents, too, have hindered progress. The drill, however, has passed through the great shale beds and now is said to be working in the sandstone formation. The Imperial Oil Company's well is on the Alberta side of the Provincial Boundary but on the British Columbia side the Ponce Coupe Oil Co. has been putting in a test hole with a diamond drill and had reached a depth of 1600 feet about a month ago. Another concern has been diamond drilling on the Alberta side but has not got down more than 150 feet.

C. I. M. & M. MEETING—Quite a lengthy and interesting program has been prepared for the annual meeting of the Western Division of the Canadian Institute of Mining & Metallurgy. Among well known mining men who have been specially invited and are expected to attend are T. A. Richard, formerly of San Francesco and now prominently associated with the *Engineering and Mining Journal Press*, New York; R. V. Norris of Wilkes-Barre, Philadelphia; J. R. Findlay of New York; R. C. Allen of Cleveland; L. C. Graton of Cambridge, Mass.; F. W. Bradley, President of the Bunker Hill and Sullivan Mining Co.; and Charles Butters. One of the features will be moving pictures illustrating Canadian Mining operations. Gold mining in Ontario, the asbestos industry of Quebec and the Trail Smelter and its allied industries will be portrayed.

Activity in Rossland Mooted—W. K. Esling, M. L. A., who is in Victoria from his constituency, Rossland, to attend the annual session of the Provincial Legislature, states that there is every assurance that, when the new concentrator being constructed at Kimberley by the Consolidated Mining & Smelting Company of Canada is completed, there will be a revival of mining in and about Rossland. The plant at Trail then, he says, will be used for the treatment of Rossland ores. The company's buildings and plant at the latter centre are being repaired and much development of the mines has taken place during the past four years.

Negotiations have been entered into by United States financiers, who were interested in the camp in its early history, for the purchase of Le Roi No. 2, the Josie No. 1 and minor fractional claims, and there is every prospect that the deal will be completed.

Proposed Ore-testing Plant—The suggestion that the proposed ore-testing plant, for which $100,000 is expected to be provided by the Dominion Government, shall be established at Vancouver, in connection with the University of British Columbia, is resented in Nelson. Fred A. Starkey, chairman of the Natural Resources Committee of the Nelson Board of Trade, asserts that it is incredible that Mackenzie King, Premier, has promised that the plant will be placed on the Coast. "The interior", he says, "is the only logical place for such an ore-testing plant;—here, right on the spot where the complex ores exist, not at the coast to be a toy adjunct to the British Columbia university—which is the Vancouver idea." He points to the 350,000 tons of ore treated thus far this year at the Trail smelter as an illustration of the need of the contemplated installation being placed in the Kootenays, as "practically all this is complex ore." True, the north may produce large tonnages, but that is in the future; the interior is the pioneer in mining and has been agitating for the plant for years. These and other arguments are advanced by Mr. Starkey in support of his position.

Rossland Properties Optioned—A report has been received from Rossland confirming the statement of W. K. Esling, M. L. A., regarding Le Roi No. 2 and the Cliff Group of Claims. Douglas Lay, manager of the company operating the "Josie", admits that an option has been granted to a syndicate of Spokane and New York business men. The Cliff Group is situated close to the "Josie" and it is stated that a tunnel will be driven to connect the properties. In the event of the deal being closed the "Josie" would be re-opened immediately and operated on a large scale.

Perry Creek—The Wild Horse Creek Placer Gold Mining Company has closed down work on Perry Creek. Mr. Palmquist, the manager, will leave shortly for Chicago. There has been much testing of gravel, as well as general development, during the summer and the Company is said to be looking forward with confidence to the results of next year's operations.

New Coal Mine in the Nicola Valley Field—What promises to be a coal mine of some importance is one being developed by Joseph Walters, ex M. P. P. for Yale District, a few miles distant from the town of Merritt.

The openings at the present time consist of a tunnel driven for approximately 200 feet. A splendid seam of coal is shown in this about 12 feet thick. A raise has been put up to the surface from this tunnel for ventilation purposes. At the point where the seam is penetrated by the tunnel, it is shown rising rapidly to the surface, and also dipping from the tunnel in the opposite direction, and from present indications, an extensive field should be developed.

The new mine is known as the Normandale. Mr Walters is to be congratulated on the splendid showing he has made.

INDEX TO MINE AND MILL SUPPLIES

Addresses of advertisers, whose names appear in the following classified index, may be found upon reference to their advertisements. An alphabetical index to advertiserswill be found on the page facing the inside back cover. The following regulations apply to all advertisers;—One-eigthpage, every issue, three headings; one-quarter page, every issue, six headings; one half page, every issue, twelve headings; full page, every issue, twenty-four headings.

Buyers who are unable to find in the classification heregiven such machinery or supplies as they desire are invited to write Service Dept., Canadian Mining Journal, Gardenvale,Que., who can in all probability, refer them to proper sources.

Canadian Mead-Morrison Co.

Acetylene Gas:
Pres-O-Lite Co. of Canada, Ltd

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Lymans, Limited.
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Babbit Metals:
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Herbert, Alfred, Limited
Holman Bros., Ltd.
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The William Kennedy & Sons, Ltd.

Ball Mills:
Engineering Equipment Co., Ltd.
Herbert, Alfred, Limited
Holman Bros., Ltd.
Hull Iron & Steel Foundries, Ltd.
Mine & Smelter Supply.

Ball Mill Feeders:
Engineering Equipment Co., Ltd.
Herbert, Alfred, Limited
Holman Bros., Ltd.
Hull Iron & Steel Foundries, Ltd.
Mine & Smelter Supply.

Ball Mill Linings:
The William Kennedy & Sons, Ltd.
Engineering Equipment Co., Ltd.
Peacock Bros., Ltd.
Hull Iron & Steel Foundries, Ltd.
Mine & Smelter Supply.

Balances — Assay & Analytical:
Mine & Smelter Supply.
The William Kennedy & Sons, Ltd.

Belting — Leather, Rubber & Cotton:
Canadian Link-Belt Co., Ltd.
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Belting:
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Canadian Link-Belt Co., Ltd.
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Jones & Glassco (Regd.).

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Gutta Percha & Rubber, Ltd.
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Wettlaufer Bros.

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Hendrick Manufacturing Co.

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EDITORIAL

These [engineers] are the men who, forming the advance guard of civilization, have conquered the wilds for humanity,...and who within the British sphere have developed new colonies, almost continents, to enrich and strengthen our world wide Empire.—R. G. Leckie 1897.

FORWARD, QUEBEC!

A few weeks ago we expressed the wonder, in these columns, that the autumn "rush" was not yet in evidence. At that time it had just begun, though the outside world had learned nothing of it. It has now reached the usual dimensions, in spite of its being centred in a region comparatively difficult of access. Contrary to the generality of rushes, it gives promise of resulting in the establishment of a gold-mining camp of first rate importance.

For years it has been known in a general way that the rock formations in northwestern Quebec adjacent to the known gold bearing rocks of Ontario are favourable to the occurrence of gold deposits of workable size and richness. In fact so many deposits of promise had already been located by the few pioneers that had worked in this area that certain of our geologists had committed themselves without reserve in commending it to prospectors. The Director of the Geological Survey at Ottawa, in particular, was so thoroughly convinced of the districts' promise that he sent Dr. H. C. Cooke's geological party into it last spring with specific instructions to do that detailed mapping of localities having the right association of rocks which is such a tremendous aid to the prospector. It would seem that Dr. Collins' faith both in the district and in this method of aiding the prospector is about to be fully justified. If the discoveries in Rouyn township and thereabout fulfil even a part of their present promise, the country will be repaid a thousand fold for the investment of public funds.

In his description today of the new gold area and the events that have led up to its discovery, Mr. Alexander Gray points out that, if there should result a gold field of sufficient importance, the extension northward of the Canadian Pacific Railway branch line from the foot of Lake Temiskaming to the Transcontinental Railway, often mooted but never as yet justified, would then be in order. The resources in agricultural land, timber and pulpwood that would be opened up by this 150 miles of railway do not warrant the investment. The added inducement of railway traffic created directly by a productive gold camp and indirectly by the contiguous settlement it automatically promotes would probably provide the stimulus to investment that is now lacking.

If Quebec is to have now, at last, its first substantial gold camp, mining in general throughout the province will be stimulated as never before. The history of mining shows that there is nothing so potent as a successful gold development in aiding the development of the other minerals. Quebec, with easy access to sea borne traffic on the St. Lawrence, is in a favoured position for overseas trade. We may logically look to Quebec as an important factor in Canada's overseas mineral trade in the future, and indeed in the near future.

THE TRUTH, THE WHOLE TRUTH, AND NOTHING BUT THE TRUTH

In commenting recently upon the various degrees of honesty and dishonesty displayed by the numberless stock flotations made lately on the basis of gold deposits, real or fancied, in northern Ontario and Quebec, we noted the fact that a number of promising properties had been handled, in some cases without intent, in such a way as to prejudice their chances of success. We referred specifically to injudicious expenditure of the money got by the public sale of stock as an easily avoidable waste. We wish to point out now a certain indiscretion that is rife in the raising of money, and affects even some of those that wish to be completely scrupulous in their dealings with the public.

Many people affirm their conviction that in order to convince the average man of the truth, one must resort to exaggeration. We do not believe that this is true, even in mine promotion literature. We are convinced, as is the larger fraction of our educated population, that exact statement, without exaggeration or misrepresentation of any sort, is by far the most convincing method. This method of informing clients and approaching prospective clients has been adopted universally by our substantial financial houses and agencies, and the growth, both in numbers and importance, of these concerns is a testimony to the efficiency of their method.

It is an ill founded tradition among mining promoters in general that over statement is necessary to a

mining prospectus or advertisement in order to convey the truth. In other lines of finance these exaggerated claims immediately brand the promotion as unsound, and the promoters as members of the catch-penny brotherhood. Mining promotion evidently has not yet advanced to this stage of clear demarcation between the true and the false.

There have lately been a number of instances illustrating this point, and, as it is a pity that through injudicious advertising and ill-conceived argument legitimate development and mining operations should be classed with the fakes and frauds that no genuine mining man can countenance, we shall name two of these.

The North American Gold Corporation lately took over the Ankerite property in the Porcupine district. The Ankerite has had a varied career; but we can state, with knowledge of the facts, that it is as near to being a mine, workable on a fairly large scale and at a reasonable rate of profit, as any property in the Porcupine district that has not yet proved itself by actual bullion production. The facts are clear enough, and are completely convincing. Yet the North American Gold Corporation, in its public announcements, makes ridiculous claims that purport to be based upon engineers' reports, but are actually gross distortions of the actual statements made. The property is of unusual promise. Such lying statements only decrease its chances of success. Fortunately this injudicious advertising matter has now been withdrawn from further circulation, and we can now look forward to a happy ending to the mining operations that are now to be resumed.

Abitibi Mines, Limited, own the Seagers claim in the Lightning River area, south of Lake Abitibi. In September last Mr. Cyril W. Knight, of the Ontario Department of Mines, examined the area, and reported that the vein on this claim and its geological occurrence were of great promise and worth thorough exploration. This from a conservative and cautious geologist known throughout the length and breadth of Ontario, is sufficient recommendation for any investor. Yet the prospectus of Abitibi Mines states that their nine claims "are now in an advanced stage of development," containing in one place "a body of exceedingly rich ore, assaying several thousands of dollars per ton," that "transportation facilities are excellent," and that there are "extensive ore bodies exposed." These are palpable half-truths that are not creditable to the men concerned in developing this property—men whose honest intention is undoubted and whose honest performance is beyond question. It were better to have let the plain, unvarnished truth speak for itself — it is much more convincing.

We hope that within the near future it will become the invariable habit of honest mining promoters to present their facts and deductions to the public in plain words, without exaggeration. It will pay.

A NEW PROCESS

Announcement is made in this issue of the "Canadian Mining Journal" of a new process for the utilization of feldspar.

Few problems have commanded so much attention as has that of devising some means of extracting from feldspar, of which rock there are literally inexhaustible deposits in this country, the potash that it contains. It has seemed that the question has always been aproached from the wrong side. Good potash feldspar will average from ten to twelve per cent in potash content. There are scores of methods of extracting the potash; but, when extracted, it does not yield enough to pay for the process. This, briefly, is the history of the great majority of processes heretofore patented.

The Brown process, however, is based upon the recovery of both the potash and the alumina contained in the feldspar. In other words, instead of utilizing only ten or twelve per cent of the rock, from twenty-seven to thirty per cent is converted into materials for which there is a demand commensurate with the growth of modern industry. We are informed, also, that the residue, which is silica, is marketable.

There is little need to impress upon our readers the tremendous national significance of a process of this kind. As operations have already been conducted on a semi-commercial scale, over a long period, there is reason to believe that the Brown process can be translated into actual manufacturing.

The first large-scale plant is to be erected in the near future. The "Canadian Mining Journal" extends its congratulations and best wishes to Mr. Brown and wishes to express the hope that his courage, perseverance, and unremitting toil will have the reward they deserve.

THE PROSPECTS FOR A ZINC INDUSTRY IN QUEBEC

On another page there appears a short resumé of the present zinc market of the United States and a forecast of conditions for the ensuing years. Mr. Kirby Thomas, among numerous other students of the case who have published their conclusions, looks for a steady demand for zinc and comparatively high prices. This conclusion has a direct bearing on zinc mining in Canada, and particularly in eastern Canada.

With ore that is phenomenal in its quantity and highly satisfactory in its combined metal content, and with a process now available for separating these metals, the production of unusually cheap electrolytic zinc from Sullivan ore at Trail now seems assured. Whether this metal can ever stand the expense of shipment to eastern Canada is doubtful. Meantime a profitable market in the Orient is assured.

Eastern Canada must produce its own zinc, if it is to have Canadian-made metal. Already there are a number of comparatively small zinc deposits located and partly developed, close to existing lines of railway. The commercial use of these deposits has been delayed, largely on account of the lack of a zinc smelter in eastern Canada, the comparatively limited market for the output of such a smelter and the uncertainty of a stable price for the metal. It may well be that the time is now ripe for the establishing of a self-contained zinc industry in the province of Quebec.

There is now a potential factor in an indigenous zinc industry that was lacking when its founding was first considered, and considered unfavourably. The zinc-lead deposits of Gaspé are now proved to be of unusually large extent, and give promise of being of the first magnitude and thus capable of being the sole support of a local zinc industry. To make the ore available, there is required a road from the railway on the sea coast at Cascapedia or Baie des Chaleurs to the heart of the peninsula, a distance of forty miles. As the provincial government of Quebec has refused aid in building this road except on terms that would prejudice the financial success of their venture, the owners of the deposits have undertaken the construction of the road themselves. It is a pity that money that would otherwise be available for mining development should be diverted to the construction of a public work — for this road will be of general benefit to that part of Gaspesia and is the pre-requisite to its development in all ways.

All things considered, we can look forward confidently to the establishment in Quebec in the near future of a zinc industry that will go far towards making us independent in our supply of this important metal.

EDITORIAL NOTES

It is reported that an organized meeting of feldspar producers and consumers has been arranged at a preliminary conference, this meeting to be held, probably in Washington, in December. The object of the meeting is to form an Association, whose principal concern it will be to formulate a set of standards, acceptable both to producers and consumers of feldspar, to regulate the various grades. Such a standardization of feldspar is entirely feasible and indeed is long overdue. The Canadian feldspar industry will benefit materially from the adoption of these standards.

We wish to draw attention to the letter on another page from Mr. H. Foster Bain, director of the Bureau of Mines, Washington. Dr. Bain wishes it to be known that the report, circulated in this journal as elsewhere, that the coal-cutting machines in use in Cumberland Colliery at the time of the recent mine explosion were of a type approved by the United States Bureau of Mines is untrue. We are pleased to publish this statement of the facts of the case.

It is highly satisfactory to note that the consistent and continuous efforts of Mr. Theo. C. Denis, Superintendent of Mines for Quebec, on behalf of the mineral industry of his province are bearing fruit under the present political administration. The provincial mining law adopted in 1909 was well conceived, but contained grave defects. One by one these defects have been remedied and the latest amendment, to be promulgated shortly, will give to the prospector, his financial backer and the Crown the best possible chance of profit by legitimate means and its fair division, while it discourages untoward practices such have retarded the growth of the industry in the past.

It is reported by the Chamber of Commerce of the United States that about $70,000,000 annually is being spent by manufacturers and others on scientific research. The computed return on this investment is $500,000,000 annually, saved as a result of this research work. Trade Associations, which are increasing rapidly in number throughout the United States, are entrusted with the direction of a large and growing part of this expenditure. The Chamber of Commerce lays especial emphasis upon the economy and efficiency with which it is possible for these Associations to conduct research. Canadians, wake up!

APPLIED GEOLOGY

Once had I quite a decent segregation
Of current coin for pleasant contemplation,
It was a source of honest joy for me,
A very enviable toy for me,
In time reactions slow, but also certain,
(As sure as moths performing in a curtain)
Set in. To my unbounded perturbation
I saw the cause — it was dissemination!
Enrichment (secondary) was my need,
My need enhanced by normal human greed.
So I forswore the complex fundamental,
And turned to oil promotions transcendental.
I learned petroleum patter — on my soul —
Until I sounded like a fumarole.
I prospered for a little while until
There came intrusion — call it what you will —
And contact metamorphic with the law,
Which superposed upon my fault its paw.
The treatment meted me was sure Satanic,
Plutonic I should call it, or vulcanic.
It left me highly altered, changed, and weathered.
Where I was "float," I'm now "in situ", tethered

J. C. M.

Letters From Porcupine--II

"INSIDE STUFF"

Little argument is needed to convince the most sceptical that intensive prospecting, that is, diamond drilling and exploratory shaft sinking, is badly needed within short distances, very short distances, of the town of Timmins. I believe that there would be something approaching an old-fashioned boom if closely held official information concerning unworked claims that border on the most important properties were divulged. As this is a highly improbable contingency, the accuracy of my belief is not likely to be tested. However that may be, there can be no question that much "inside" territory is favourable territory, and that it should have attention. I am disposed to agree with the Englishman quoted in my former letter to the effect that similar ground in South Africa or Australia would have been opened up long ago.

In this respect Porcupine is an ideal locality for operators who have had some experience in other camps. Diamond drilling can be carried on cheaply and expeditiously. It can be made determinative now more rapidly than it could have been two or three years ago. The commitment in drilling is relatively small compared to the possible and probable prize.

For "inside" exploration, then, diamond drilling seems to me the "better 'ole". It is a much saner way of applying money than is the usual purchase of share control in organizations that already have a load of over-capitalization to carry.

* * *

It is noteworthy that the total mining, milling, and administration costs chargeable against each ton of ore handled in the three large producing plants of Porcupine are considerably lower than the objective set by Transvaal operators in their present struggle to reduce costs. On the Rand costs ranging between $6 and $7.50 per ton are not so usual as are even higher figures. Judging from the histories of both regions, it seems safe to assume that mining and milling costs will remain lower in Northern Ontario than on the Rand.

This is due, in part at least, to the brilliant—and little advertized—achievements of two men whose work has made milling history in Porcupine and, indeed, has given some permanent additions to the science of ore treatment. To mention names would be unfair. To a certain lesser extent other men share the credit of bringing milling practice in Porcupine to its present condition. It is not, however, the fact that costs are low and extraction high that is the most significant feature; it is, rather, the equally patent fact that constant improvements are being made. The spirit of the camp is right.

* * *

The path of the independent assayer in Porcupine is a thorny one. He must compete directly with the Government establishments. Much work that should be his is done in mine assay offices. In fact he not only gets no protection at all, but there seems to be a conspiracy to put him out of business. Whatever the merits of the case, the independent assayer assuredly gets a raw deal, a deal that has been raw so long that decay has set in. He asks for bread—and he doesn't get even the stone substitute. In all fairness the mining fraternity should do something to rectify this inequity.

The mining companies that own widely distributed undeveloped properties in the central townships have their chances of success greatly augmented by work that is going on now. This statement applies particularly to the townships of Tisdale, Deloro, and Ogden. From what I have seen during numerous inspections of properties in the latter two townships, I should venture a mild wager that developments in the next six months will greatly improve the status of both. There will then, I hope, be no longer any imaginary need of trading on the glories of the long-suffering Hollinger, Dome, and McIntyre to bolster up a flabby prospectus.

Most encouraging results are being reported from at least two localities to the north-east, outside the unofficial boundaries of Porcupine proper. These are what the oil driller would call "wild cats", by no means a derogatory term. They are legitimate ventures in unproven but exceedingly promising ground. More power to them! May no croakers be permitted to discourage them!

* * *

Within limits "high grading" is considered a venial sin. It is winked at by the "high gradee". As witness the following: While examining a lot of rich specimen ore displayed on the dump of a Porcupine mine, a super-ethical Canadian professor was observed surreptitiously jamming a few of the choicest pieces into his side pocket. Technically that professor is quite as liable to arrest as were recently extradited children of sunny Italy. However, the prick of conscience that he will suffer when he reads this will be his only punishment.

J. C. MURRAY

CONTRACTOR AND COMPANY FINED

On information laid by Mine Inspector James Bartlett following his investigation of the recent fatal accident in the shaft of the Herrick Mine, West Shining Tree, Ontario, those responsible under the Mining Act of Ontario have been prosecuted and fined.

Felix D. Henderson, contractor in charge of the shaft sinking for the Tonopah Mining Company of Nevada, was fined $500 and costs by Police Magistrate D. M. Brodie, of Sudbury, on November 2nd, 1922. The charge was that a cross head not equipped with a safety device was in use in the shaft. The Tonopah Mining Company also were fined $500 and costs on November 3rd., by the same magistrate, on being found guilty on the same charge.

Thus is the law upheld in our land, at the price of ceaseless vigilance on the part of our corps of mine inspectors. Seldom do the public hear of the activities of the guardians of the law, whose principal concern is the safety of life and limb in the mines. Yet the mining acts of the various provinces are among the best administered of all the laws of our country.

Quebec Gold Area Being Established

THEIR EXTENT, MINERALIZATION AND RECOGNITION BY KNOWING INVESTORS ARE MAKING THAT PROVINCE THE MECCA OF THE MOMENT

By ALEXANDER GRAY

Prospectors, those pathfinders of the solitudes who wrest wealth from the wilderness, have been busy for two years in Northwestern Quebec. The result is the preliminary demonstration of a gold field or fields of major importance. That is why Quebec has changed its Mining Act so that "blanket" locations cannot be made except by license and actual staking. This change has not been officially promulgated, but will be in a few days. Work and pay will be pre-requisites to patenting.

Following the sign-posts of Miller, who quietly foretold that the pre-Cambrian shield sheltered Quebec's share of the precious mineral wealth for which Porcupine is now noted, "although the geological features may not be of the same age," accepting the judgments of Scientists such as the Wilsons, Tanton, Barlow, Burwash, Parke, Bancroft, Knight, Burrows, Bell, Dresser, the youthful Hopkins, Mailhiot and latterly of Cooke, the "sourdough" fraternity has effected another peaceful revolution by making the waste places of Gaspe and of Pontiac County of Quebec, arenas for more of those Great Adventures that romantically adorn the pages of history.

Beginning at the interprovincial boundary, extending east toward the Harricanaw River and south from the Height of Land, near what is known as the Opasatica section; revolving round Rouyn, Boischatel and adjoining Townships, and based upon the Rainboth-Blouin line, in the midst of a territory heretofore written off by almost all others than the lumberman, trader and trapper,—enough favorable geology and gold have been found to form the nucleus of a "boom."

Country Being Rapidly Acquired

Thousands of acres have been staked and are to be surveyed. The rocks are right and the fracturing favorable. Out-cropping ore bodies have induced representative mining engineers and well informed, alert prospectors to locate areas and take title to blocks of ground. Perhaps it is a trifle early to indulge in prophecies as to the extent of the gold fields and consistency of the values. Temporary suspension of these and admitted inaccessibility, may not preclude snowshoe staking, and will not deter the more enthusiastic from sharing the ardent view of the Goudreau prospector who declared: "Why, there's so much gold, the feathers of the fowl are covered with it!"

Flights of fancy, when seasoned with fact, are permissible in the circumstances; but they do not make a gold field. It is more to the purpose to have it authoritatively known that Quebec has joined in that development which has made Ontario the most attractive play-ground for speculative capital. The Scientist said Quebec would be reached by evolutionary stages, if not by aggressive exploitation. It has been. One section sampled along about a thousand feet is alleged to have given various results of $15 to $25 across 8 ft. That will suffice, when more convincing evidence is forthcoming. As a prospectus it has more substance than a lot of what is appearing in the public prints, representing a surface showing as "another Hollinger," a mere handful as "the greatest ever." It is more to the point and satisfactory to have it that Quebec's gold country is undergoing preliminary "enquete". It will take next summer to complete the testimony. Meanwhile eminent authorities are impressed. Scientific judgment is being justified. Current events sustain these forecasts.

Quebec Superintendent of Mines Denis in 1910

"Of the resources which were practically dormant for a long time, Gold requires a special mention. The Province of Quebec comprises an area of about 375,000 square miles, of which the southern belt alone is comparatively well known as regards its mineral resources. There remain over 300,000 square miles which are practically unexplored, and which offer to the prospector a field fraught with possibilities. There are at present two regions which are attracting special attention, viz: the region between Lake Abitibi and the Ottawa river, immediately to the east and northeast of Lake Temiskaming, and the Chibougamau Lake region, 175 miles west of Lake St. John. In both of these regions, as well as in the territory between them, there are large areas of Huronian and Keewatin rocks and it is in the rocks of those formations that occur the silver deposits of Cobalt, the gold deposits of Porcupine, of Larder Lake, the Nickel deposits of Sudbury, the copper deposits of Bruce Mines. There is little doubt that the 'hinterland' of Northern Quebec contains immense mineral wealth awaiting the hardy prospector."

Professor J. Austin Bancroft in 1912

"Considering the discoveries of gold which have been made in the vicinity of Kienawisik Lake, diligent prospectors should carefully examine every acre in this vicinity with the well-founded expectation that much better discoveries may be made. During the past summer (1912), numerous prospectors were in the district, but by far the majority of them restricted their endeavors to the rock exposures on the rivers and lakes, soon becoming discouraged by those difficulties with which they were called upon to contend. Until no stone has been left unturned, this area offers more reasonable hopes of reward than those vast expanses of country within which discoveries have been made. Prospecting should not be concentrated only in the vicinity of Kienawisik and Blouin Lakes, but should be extended to adjacent areas, especially to the eastward and westward of Kienawiski and Blouin Lake and the narrows extending to Lemoine Lake. At the time of our examination of the area, these discoveries of gold that had been made pertained to veins of narrow width and of such character that further expenditure of money was wisely being devoted to a search for veins of greater promise. It is to be expected that thorough prospecting will be attended by such desirable discoveries."

The First Move

Four years prior to the organization of the geological field parties of which Dr Bancroft was one of the chiefs, the writer, at a privileged session in the Government Offices, at Montreal, persistently urged the unwisdom of Quebec indifference to mineral developments immediately west of the interprovincial boundary. Minister Devlin was courteous and earnest. He acknowledged the urgency of having a provincial laboratory, and assented to the idea of mapping what was

somewhat unsurveyed territory, if not the province as a whole. A month or two later, however, a curt note was received by the petitioner to the effect that if my idea was to interest the province more largely in mining affairs, it could not be entertained.

That was in 1908.

Now there is a Mines Department presided over by a more responsive, capable Scientist, who in 1910 thought the "hinterland" of Northern Quebec had rewards "awaiting the hardy prospector". Mr. Denis wrote a pamphlet for the National Exhibition at Toronto in 1910, from which I quote an excerpt. Meanwhile the "hardy prospector" had left his imprint upon the pages of Ontario's mining history; so, in 1921, Mr. Denis returned to the issue and incorporated this in his report.

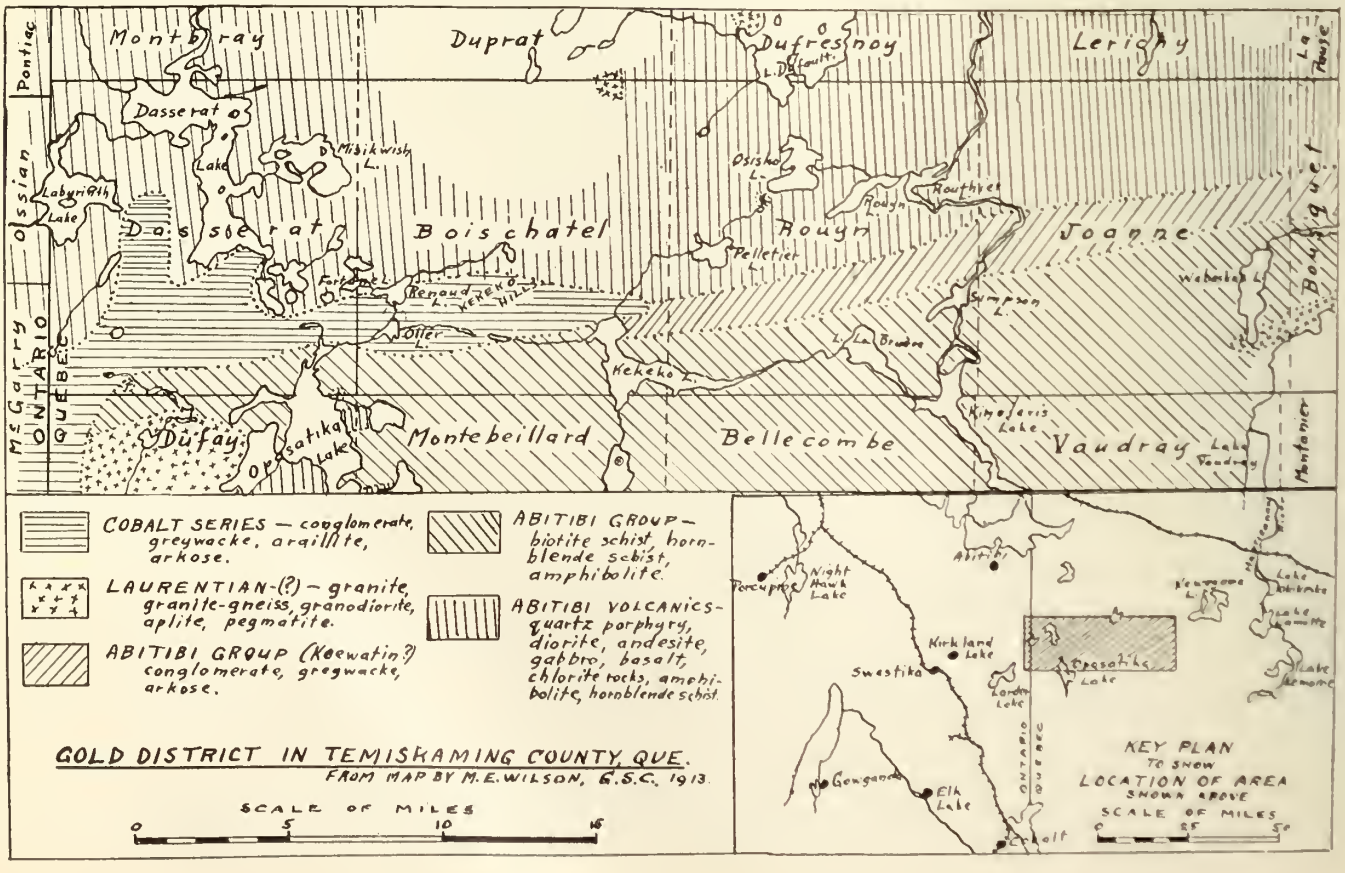
> "There is at present no gold industry properly speaking, in the Province of Quebec, that is production of gold from quartz veins or from Placer deposits, although the province possesses both kinds of deposits. Very promising areas containing gold-bearing veins are known to exist in Northwestern Quebec, in the region of the Transcontinental railway, east of the interprovincial boundary between Ontario and Quebec. The geological conditions in this region are very similar to those prevailing in the mining regions of Ontario, such as Porcupine, Kirkland Lake, Larder Lake, and a gold mining industry will certainly develop in time. While these two areas are the most prominent of the Quebec gold districts, the presence of gold quartz and of gold-bearing sands has been observed in numerous other places in the Province."

"Crooked is The Path"

By the tortuous route Quebec eventually is achieving what the Scientists foresaw. It has not been a royal road to the disclosure of wealth. For almost twenty years Ontario has been upon the tidal wave of mining prosperity, occasional spills being only temporarily disconcerting. Most of that time Renaud has hibernated around Lake Fortune. Olier joined him and had a lake named after him. They found gold at Opasatica. More gold was reported further east at Chibaugamau. Preferences fluctuated between the Abitibi-Opasatica and Chibaugamau sections, so-called. Expert testimony by Miller, Brock, the Wilsons, Bancroft, Tanton, Barlow, Denis, Miller, Knight, Burrows, Bell, Dresser — a goodly array — bearing upon the geology of Northeastern Ontario and Northwestern Quebec, did not disturb the pastoral serenities of Quebec, which was advised by the late Mr. Obalski that the gold discoveries of Olier and Renaud were unimpressive. It almost seemed as though there was constitutional objection to mining developments in the largely uncharted province, with its undoubted possibilities as disclosed correlatively in Ontario. Singularly, though when Cobalt was in its prime, the reasonable inference was that the Quebec area east of Lake Temiskaming might reveal silver. The follow-up fell short.

A Road And Railway Ready

Consequently, and rather casually, Fabre and adjacent townships were given the "once-over". A few showings were noted, and official cognizance given them, but precedence went to "the diabase" and "bloom" of the Montreal River country. Really, the thought of gold was not seriously entertained, after misadventures in Western Ontario, and the ferruginous dolomites of Eastern Ontario and adjoining Quebec territory were considered unpropitious. In 1906 Mr. Obalski, on behalf of the Quebec Government, had commented rather equivocally upon what Olier and Renaud found near the height of land in Quebec, where Revillon Brothers, anticipating an influx of prospec-



tors, established a store at the head of Lake Opasatica. The original "hardy" prospectors were years ahead of the good wagon road now approaching completion from North Temiskaming to Opasatica and the enterprise of the Canadian Pacific that is feeling for the opportunities in that vicinity, intending, if the situation warrants it, to extend a line north to the Transcontinental. Recently the Dominion Government sent Dr. Cooke, who looked into the settlement and mineral possibilities of the section. The Canadian Pacific seeks tonnage. The "hardy prospector" remained in suspense for almost two decades, notwithstanding the trained scientific observer made it of record that nothing should be left undone to locate what Ontario was presenting in the way of economic minerals. For the policy of procrastination the Quebec Department of Mines was not at fault. Mr. Denis not only has been alert; he has been progressive and made his official documents a standard of excellence in contents and letter-press. Somehow and simply, Quebec was given the go-by during the probationary years since Porcupine was found.

Scientists Supplied the Lines

It is customary to have that matter-of-fact Scientist, the Geologist, ironically described as someone who "never made a mine". Glamour goes to the "sourdough" fraternity. What Ontario and Quebec (all other mineralized areas for that matter) owe to "Bergassessors" (the "Rock-knockers") never has been written into poesy by even the immortal "Anon." Politicians will have it that the "rock-hound" is an excrescence. However the "clay belt" is an Eldorado, and, instead of pelts, Quebec presently is going to talk in the language of Boisehatel, Rouyn, Dubuisson, Pelletier, Routhier, Osisko, Okikeska, Askikwa, Kienawiski and Lemoine—not overlooking Opasatica.

There is another map in the making. Deeper respect may be engendered for the Quebec section of the Transcontinental Railway and its tributary areas, while the Canadian Pacific is "spying out the land" and thinking of driving more stakes. What is going on in all probability could not have been accomplished ten and fifteen years back, for now there are accessory transportation facilities. Even now much of the Quebec mineral-bearing section between the Harricanaw and the western border, is no place for the faint hearted and weakling. To be sure, Quebec, until Mr. Denis convinced his chiefs that the rainbow did not stop at the Ontario border, was rather unconcerned. A monument may yet mark the location where Ollier and Renaud fruitlessly toiled on the fringe of formations in and next door to auriferous areas comparable with those of great portions of Ontario. The prospectus of the Pontiac and Abitibi Company published in 1908, reciting how much profit was about to be obtained per annum ($3,000,000) was pleasant somnambulism—not a "beauty sleep."

How The Pendulum Swung

Opasatica was tested before Porcupine. Lake Ollier and Lake Fortune were the scenes of excitement, and subsequent derision, when the late Mr. Obalski was dissatisfied with his sampling results. The Pontiac and Abitibi and Union Companies left their mark—with a cross. Simultaneously Larder Lake was painted "couleur de rose" and capitalized accordingly. Chibaugaman, too, went rocketting—with the usual result of pyrotechnics. However, those episodes did not differ in detail from the Ontario mishaps that left the people of the province with debts and doubts. Rainy River and Lake of the Woods tallied with the prematurities of Rossland and environs. Following so closely upon the high pressure days of Cobalt, zest was given to snow-shoe stakings at Larder Lake in the first decade of the century by the glowing accounts of the values and widths. It was an entrancing moment when the human calliope gravely informed me in the lobby of the Prospect Hotel at Cobalt that "the only way to deal with the Harris-Maxwell is to put the whole thing through." And as for the Reddick—put the wealth of the Indes, the lucre of the Incas and the output of the Land of Ophir into the muffle, and the bead would be infinitesimal alongside of what the Reddick would contribute.

Then Nighthawk, in 1907, displayed its charms, to be laid away for another thirteen or fourteen years, suitors being scarce. Painkiller in 1908 did not have a soothing effect. Munro was a shooting star, in 1909. Porcupine contemporaneously became fixed in its orbit, and no telescope is needed to locate it. This is not true of Swastika (nativity, 1910) christened and interred in infancy, despite keen competition in propitiating the emblem of Good Luck.

In rapid sequence so many "discoveries" were reported, and so much was staked in the pre- and post-Porcupine period, that the Maple Leaf seemed to be supplanted by the Gold Leaf in Ontario. If the find was not "another Hollinger" it was "another Dome". When the supply ran short, "Reserves" and "Extensions" were requisitioned, unmindful of the fact that "another Kerr Lake in the diabase" has yet to be found.

Where Quebec Was First Jolted

Perhaps the most joyous days are those when blazes and beams predominate. This is written without attempt to disparage "bootlegging" incidents and illicitly-obtained moose-meat. There was massed wealth when Latchford was the seat of Government, or Elk City. The air was filled with cadences when Jondoin joints and Crawford's and Hill's were the abode of embryo millionaires. Olier and Renaud sought the by-paths at Opasatica. Mosher and his mates took pot-luck at Abitibi. The former duo had sufficient to induce them to purchase two blocks of land from the Quebec Government, Mr. Obalski reporting that "fine samples of quartz, showing gold, were produced with the applications." Part of that ground was transferred to the Pontiac and Abitibi, and some of it to the King of the North Mines. Corporate existence, though, was jazzed by the visit of Mr. Obalski in 1907, and this comment:

> "I visited this property again and found that very good progress had been made during the year, consisting of the discovery of numerous veins of quartz from a few inches to several feet in width, on which shafts 15 to 20 feet had been sunk. I was shown pieces of quartz containing gold, taken from those veins and, as stated last year, by washing the earth and debris around several of those veins, I found fine colors of gold, especially at the shaft where the discovery was made near Lake Fortune, the rock there having a certain analogy to Larder Lake. The general formation of this region is greenish diorite [illegible] fairly compact and quartzose traversed by veinlets and veins of quartz which do not seem to have

any special direction. South of Lake Olier is a considerable development of very hard, reddish porphyritic rock. These same eruptive rocks are also met with after crossing the height of land, on the eastern shore of Lac des Isles. I took several samples of quartz which I had assayed and which yielded no gold."

Otherwise put: The stockwork did not make the grade. Cooke and Hopkins supplementing what Bruce wrote, held that ferruginous dolomite without requisite mineralization and intrusive auxiliary factors, was lacking. Singularly enough, Olier and Renaud hibernated near where there existed the wealth Dr. Bancroft foretold. The Great Northern Gold Fields Company was pretentious in name only. Silicified dolomite, mixed with schistose serpentine, was too serpentinous. Of the eruptive masses noted by Mr. Obalski, who assumed they contained "elements of granite", it is not importable that if he had gone into the field prepared for further explorations, he would have found corroborate evidence of the potentialities of the district—those beneficial intrusions of porphyritic masses, the syenite porphyry and the faultings that have resulted in "desirable discoveries", as Dr. Bancroft expressed it.

The Montreal River Deflection

Had Mr. Obalski and others given the locality the requisite detailed investigation, the volcanic rocks more recently mapped would have conveyed their true significance and Quebec would all the sooner have joined the gold movement. Fifteen miles away was Larder Lake, now becoming opprobrious. Callinan and Mosher at Nighthawk and Abitibi Lakes, respectively in 1908 were "as one crying in the wilderness." The movement had been east and northeast prior to Porcupine. Larder Lake printing presses having broken down, the "die-hards" of Quebec clung to Chibaugamau while the "hardy prospector" would have it that every forty acres throughout the Montreal River country represented from one to five millions as a starter. Shooting the rapids or portageing round them were all in the day's work toward silver in car lots. The Gowganda trail became the Appian Way. Hyperbole was universal in describing the "bloom" and "native". The "Downey", "Otisse", "Moose Mountain", "England's Premier" hundreds of incorporations reflected that "incorrigible optimism" which is admirable if expensive. Strenuous capitalists contended for the "Mann-Ryan". The "Boyd-Gordon" was entrancing. "Reeve-Dobie" and more "Silver Sidewalks" than Drummond could poetically depict. And when the "Blackburn" became the "Millerette", and the O'Brien-Sifton coterie bought the Bonsall and other claims, there was nothing to it but silver by the square league and limited trains to the White Lights, by way of celebration.

Porcupine Sustained and Disapproved the Scientist

Meanwhile Quebec had no silver east of Lake Temiskaming. Montrealers kept faith in Lake Fortune, Chibaugamau was under the ban of "Missourians" who had not been "shown". Not until Porcupine geology, mineralization and the relationship of shearing and porphyry had been accurately delineated by Miller, Knight, Burrows and others, whose horoscopic estimate of the pre-Cambrian country has been the basis of much of the development, was the prospector recompensed—and more often disillusioned. One school of scientific thought pronounced Porcupine to have "bull" quartz; decidedly lenticular veins in schist, and never-never shear zones. There were incredulous Canadians who decried the structures and condemned the mineralization. Prospectors and more venturesome speculating capitalists absorbed areas from Nighhawk and Frederickhouse Lakes to the Mattagami River, and overran the Temagami Forest Reserve. "Quartz" was the slogan, regardless of precedent occurrences. Gold by the square mile was taken for granted. It became the vogue to have quartz and schist, instead of the diabase. "bloom." smaltite and native silver of the Montreal River era.

Prospectors and all concerned had to learn that mineral deposits make their own differentiations during periods of deposition. There will be more producing mines at Porcupine, but there are fewer of them now than there were at the outbreak of the War. Swastika and its townsites are so many blanks, so far as outputting goes. In 1911 Shining Tree and the "White Guide of the Temagami" were to the fore. Whiskey Lake was appropriately celebrated. For a while the gold development was rather intermittent, Kirkland Lake alone being accepted as assuredly supplementary to Porcupine. Kirkland Lake gave renewed impetus, and the wherefore of this is tersely stated by Dr. Goodchild, of London, who made an exhaustive study of that section in particular. He writes:

> "The whole of northern Canada in modern times has been covered by a thick mantle of moving ice. This ponderous cover of ice gradually scraped away the rock surfaces over which it slowly moved for ages, mechanically grooving out the least resistant portions of the land surface and leaving the harder and more resistant portions standing in the form of low rounded hills with intervening shallow valleys together with a multitude of lakes and swamps in the deeper hollows, the latter resulting from the subsequent passing of this period of intense glaciation.
>
> "Faults and shatter zones are obviously lines of weak mechanical resistance to such drastic erosive action. Hence the topography of the present dry land surface is an important aid to the interpretation of the structural geology. A cogent illustration of this is the Lake Shore Mine which is at the moment of writing the richest developed property on the Kirkland Lake Goldfields. The orebody is situated beneath the lake and this is no mere accidental circumstance, for a great part of the lake system of Canada and many of the more important rivers course on the banks of great faults and fracture zones that were originally grooved out by glacial erosion."

Gold-Seekers Begin To Look Eastward

So much for topographical features. More than one mine at Porcupine and Larder Lake has been a source of anxiety before structural features and the significance of faultings were elucidated. Beginning in Quebec, before Porcupine as a gold field was of record other than by what Burwash and Parks had foreshadowed, interest had alternated; but prospects fell short of requirements. The Pearl Lake and Dome sections proved to be more educational in value than in production, almost; for only from scientific prognosis and practical demonstration was it made conclusive that Northern Ontario was the most promising of the new gold countries. Going west from Porcupine as far as Shining Tree, the army of adventurers counter-

marched to Kirkland Lake, thence to Lightning River and the Harricanaw and finally to the Townships of Boischatel, Rouyn, Dubuisson and others, immediately west of the Harricanaw where Dr. Bancroft wrote that "systematic and intelligent prospecting of the areas of other rocks should be attended finally by the discovery of minerals of value; but, unfortunately, over by far the major portion of this region, efficient prospecting will always be a very arduous task. Owing to the heavy and almost universal overburden of stratified clays and sands, outcrops of rocks are very widely separated. Inland from the waterways, the country is covered by a blanket of moss, and rock exposures are confined chiefly to the very sparsely distributed low hills and ridges; but, frequently, in making traverses of the bush one will find outcrops of rocks when least expecting their presence."

Present Day View And Events

Cooke had it that, according to all accounts, the geology of the Porcupine district is essentially similar to that of Opasatica. Professor Mailhiot, reviewing the work of W. J. Wilson and M. E. Wilson, Bancroft and Tanton described the rocks of the Pontiac and Volcanic Abitibi Series. Unfortunately, three years ago Professor Mailhiot did not reach the scene of current activities, in generally referring to which the Honorable Minister of Colonization, Mines and Fisheries, of Quebec, J. T. Perrault, officially wrote last week:

> "On casting a glance over a map of Canada, one is at once struck with the tremendous area indicated as 'Province of Quebec'. With its 706,000 square miles, Quebec is the largest of the Canadian provinces. Of this expanse, 90 per cent. is practically unknown as to the mineral resources, but from geological data at hand, its potentialities are very great. The northern 500,000 square miles, enormous as it may sound, is at present difficult of access to the average person. But the balance, constituting the southern third of the province offers an ideal territory to the individual prospector, for the canoe routes are innumerable, and the railways bring all parts within reach. Colonization and mining, in new districts, work harmoniously as each helps the other. The mining camps constitute a natural market for all the produce of the settler, at prices higher than those obtaining in older settled parts, and the miner, however high the price he pays to the local farmer, gets the product cheaper and fresher than if he had to bring it in from distant parts."

Progress Evolutionary Rather than by "Leaps"

Minister Perrault need hardly have emphasized that Quebec progression has been slow but sure, steady rather than by "spectacular leaps and bounds." He expressed his conviction that the mining industry of the province is yet in its infancy, with the possibilities offered "second to none anywhere". It is obvious why Quebec has been on the deferred list. The Mines Department of the Province could not have accomplished more, with the facilities at hand. Because of the Eastern Ontario developments, the Quebec foundation is all the surer. Whether it be in the Lake Montigny, Lake Blouin, Lake Lemoine, Lake Piche area (known of for more than a decade) or between these and the Ontario border, evidence is accumulating that Quebec has more than "potentialities". Even though the demonstration of this has been slow, while previous discoveries and work have not attracted other than Canadian capital, the exploitation of the Martin ground, publicity given to the Siscoe and Sullivan (all in the Lake de Montigny area) certainly accelerated the pace. Perhaps Professor Mailhiot's epitome of the past will serve to show how pioneers have fared:

> "The first gold discoveries in the Lake De Montigny region date from 1911. On the 11th of July of that year, Messrs. J. J. Sullivan and Hertel Authier discovered gold on the east shore of Lake De Montigny in a quartz vein which has become (1919) No. 1 of the Sullivan property. The discovery become known only near the end of the fall of that year and a great many prospectors were attracted to that region. In the same year two gold-bearing veins were discovered on the property owned by the Martin Gold Mining Company, Limited, (now being developed by New York people). In the following year (1912) two other veins were discovered in the region. One, the Smith vein, at some distance south of Lake De Montigny, which was staked by different persons after its discovery and now belongs to Mr. George Neveu, is situated on lots 44 and 45, range VIII, Dubuisson township. The other, the Benard vein, now owned by Mr. Tancrede Marsil, is situated on lot 39, range I, Varsan township. In 1915, on Siscoe island, the largest in the lake, gold-bearing veins were also discovered on the claims now belonging to the British Minerals Corporation, Limited. Besides the work done on the island by the Siscoe Mining Syndicate and on the Martin property, where development has been done and a mill has been put up, very little prospecting was done during the War. Since the signing of the Armistice, a great many prospectors have gone to the region around Lake De Montigny and have made discoveries; among which the following may be mentioned: the Stabell, Legault, Parker, Clowse, Caron, St. Germain, Gale, Craft, Foisie-Kengow and some others."

Of the Siscoe, it has been reported that "the gold is found in veins and stringers of quartz in which there is a good deal of tourmaline, a little calcite and an abundance of iron pyrites." Dr. Bancroft, Professor Bell and John A. Dresser were of the opinion that the values obtained and nature of the occurrence were sufficient to "warrant undertaking further development work." Professor Mailhiot in reviewing the Martin property said there were "ten different veins, five of which were main veins and five were outcrops of lesser importance. The company had "a shaft 125 ft. deep, with cross cuts and drifts 100 feet long, in a vein of gold-bearing quartz, explored on the surface."

The Scene Shifted Nearer to Ontario

Leaving the original properties and what they may possess, in the Harricanaw country, where Lake Okikeska is now Lake La Motte, Lake Askikwaj is Lake Malarlic, Lake Kjenawisik is De Montigny—forgetting the height of land molybdenum of fifteen years ago—Mr. Obalski on his flying surveys of those years was keenly observant. About that time Quebec raised the price at which mineral lands could be purchased and limited the area obtainable by individual applicants. Near the Harricanaw tributaries Mr. Obalski saw diorites, porphyry and syenite, but differed from Mr. Brock in his definition of the silicified dolomites of the Larder Lake-Abitibi Lake sections.

No more than cursory reference can be made to the number of discoveries made at the Sullivan, Stabel, Martin, Neveu, Callinan and others. They have the same relationship to what is going on at this moment, as the Hunter find on the south shore of Porcupine Lake had before Wilson and Hollinger were heard of, and to that pit sunk on what became the Dixon (the Acme Area of Hollinger Consolidated) long before Pearl Lake was crossed on the ice by Noah Timmins and his newly-purchased horse and wagon.

Regarding this Stabell property, an effort is to be made to develop it under strong Montreal auspices. During the past week arrangements to this end were completed. The outcropping ore-body is in the basalt and is intersected by a syenite porphyry that cuts through it. Stripping has been done for several hundred feet and the values compare with the average of the Kirkland Lake field. It is proposed to drill this very promising vein, sink upon it and do considerable lateral work. For this the money is being provided; so the Stabell will have a chance it has been denied by reason of the exacting conditions of the owner. Undoubtedly the Stabell is a likely, substantial prospect, and is deserving of what the interested Montrealers propose to do.

Quebec was not ready for diversion. Porcupine brought down upon the head of the writer the maledictions of a very lovable impetuous scientist, when it was publicly recorded that the values in the Dome crosscut at the 45-ft. level averaged $12.42, and that Legget had given the Hollinger shallow workings and outcrops a general average of $37.50. Nighhawk was in the discard.

Governments, like capitalists, have to be convinced. Government Geologists are as prosaic as many of the minerals they are called on to deal with. Sixteen years elapsed until Minister Perrault could publicly proclaim that Quebec is another Land of Promise and prospective performance, even though its Northwestern section be difficult of access and only for strong combinations to explore. That being so now, all the more is due to the memory of Mr. Obalski, who made that exploratory trip in 1906 from Ville-Marie to the Baie des Quinze, thence to Lake Expanse, following the Ottawa to the Kinejeviz, up that and the Keegama, and on to the Harricanaw. Mr. Obalski had to stick to his canoe route (as the writer told the late Minister Devlin) and could not do more than that. He skirted the region on the east, missed the very thing he was seeking, notwithstanding he said he felt keenly the desire to duplicate "the important discoveries made at Cobalt" and assumed "the same Huronian formation existed in Quebec." Mr. Obalski, like Messrs. Mailhiot and Bancroft, had a defined area to pass on, although Mr. Obalski was free to go wherever he could with his limited party and equipment.

Within almost a township's length, where the Rainboth-Blouin base line was run, the rush is on, and the snows of winter, flies and mosquitoes of summer, muskegs and charred, fallen timbers, complicated by drift and moss, will not stop the staking. Much of this already is foredoomed to failure. As usual, there has been staking in and out of lakes, on superimposed Cobalt series rocks—anywhere and everywhere on the off-chance of favorable ground. Quebec Mining Laws are liberal, especially when applicants are responsible citizens. Holders of ground with something or nothing are elated at what they look for when the break-up comes next spring.

Where It Is

In the row of townships extending from the Ontario boundary—Dasserat, Boischatel, Rouyn and Joanne—based upon the Rainboth line of 1897 and the Blouin line of 1906, is where all this eager staking is going on. Therein is the Pontiac series of the Abitibi group. As already intimated, the Olier and Renaud claims (Pontias, Lake Fortune and King of the North Companies) were just to the west of the Kekeko hills, on the edge of the overlying Cobalt series. There is a stretch of this Cobalt series extending to Lake Kekeko. Immediately to the north are the biotite schist, hornblends schist and amphibolite. Immediately north and in contact with the Cobalt series is the expanse of Keewatin rocks,—the Abitibi volcanics, quartz porphyry, diorite, andesite, gabbro, basalt, chlorite rocks, etc., as defined by the Wilsons, Bancroft and Brock. Underlying this Cobalt series, seemingly, in the Townships of Dasserat and Boischatel, is a section of conglomerate, greywacke and arkose rocks, which traverse in a northeasterly direction the Townships of Rouyn, Joanne, Bousquet and Cadillac. The whole area is lake-strewn, matted and made difficult by fallen timber, many outcrops being chance discoveries.

Generally speaking it may be stated that the region was originally underlain by volcanic rocks of Keewatin age, mainly rhyolites and basalts. There are granitic intrusions succeeded by syenite porphyry, similar to that of Porcupine, Kirkland Lake, and to some extent of Larder Lake. The porphyry occurs in masses and as dykes connected with the masses. In places the schisted basalt is cut by quartz veins, and there are shear zones in relation to the porphyry which make those localities in particular objects of greater interest.

At the moment, the western end of Rouyn Township has been staked or acquired by agreement with the Quebec authorities. Everything around Pelletier Creek and Pelletier Lake, to Osisko Lake, is held. Horne started it a year ago, the Cockeram Brothers, Arthur and Robert, Marty Wright, Billings, Davies, Gamble, Charlie Richardson, Fred. Connell and Powell following, until there is no doubting the strength of the column. What Sam. C. Thomson and his associate, Mr. Chadbourne, have in their own right or by option, they have not divulged. Mr. Thomson is a mining engineer of international repute and conceded good judgment in new country.

Messrs. Thomson and Chadbourne have all or part of the Cockeram and Powell under agreement, and some of the Horne ground. Ottawa people are behind Robert Gamble. The breaks are said to run northwest-southeast.

Most of the areas are held in blocks of a thousand acres or two, so there is ample scope for those with the requisite capital. The breaks are pronounced. If one line of outcrop differs from Kirkland Lake in that the average values are alleged to be between $15 and $25, as sampled, there is a sound basis for what has happened.

In this connection, and emphasizing what seems to have been forgotten in considering Kirkland Lake and these eastern extensions, some of the Kirkland Lake producers had little or nothing at outcrop,—just a crack and low values. Kirkland Lake (and doubtless also this Quebec field or fields) required intensive exploring operations. Anyhow the Abitibi volcanics have a deeper meaning on the map, now than formerly and Quebec is to be congratulated upon developments.

Plenty of Ground to Play With

Ontario is accustomed to snowshoe staking throughout its silver and gold country. There is no need of this in the latest gold areas of Quebec. The Quebec Government will not record what has not been staked in accordance with the amended regulations to be promulgated. In bringing this about the Mines Department and Mr. Denis in particular, have rendered wholesome service to bona fide prospectors. Selective staking in the manner to be prescribed, is preferable to wholesale blanketting. Already it is realized that random staking is apt to be unremunerative to those concerned. The intrusive granites and porphyries are extensive. Basaltic occurrences are strongly developed. Enough ground is held by responsible people to engage the attention of field forces next summer. Meanwhile there is no hurry about blazing boundaries of what may not justify the cost. Porcupine and Kirkland Lake have supplied the object lessons. There are a small number of producers and a larger number of prospects deserving of development, but the useless claims outnumber many, many times those that give even a faint promise of becoming gold producers.

BIBLIOGRAPHY OF CANADIAN GEOLOGY

The Geological Survey maintains, at Ottawa, a bibliography of Canadian geology. This is an author index of the most important articles on Canadian geology published in periodicals, bulletins and transactions of scientific societies, and reports of various government departments, federal and provincial. It also contains references to papers written by Canadian geologists on geological subjects not connected directly with Canadian geology, and for recent years it is fairly complete. This bibliography is in the charge of Mr. Wyatt Malcolm, and may be consulted by the public. Readers of the *Canadian Mining Journal* are welcome to consult this index at any time they may be in Ottawa, and written requests for information from the bibliography will also be given attention. In writing for information the name of the author of the particular article wanted should be given, and in case the title of the article is not known some clue should be given as to its contents.

The Dominion Water Power Branch, Ottawa, estimates that the per capita consumption of coal in Canada for all purposes is only two thirds that of the United States, in spite of the colder climate. In industries and in the generation of electric power Canada's use of coal per capita is only two fifths that of the United States. The saving in our coal bill from the use of water power is approximately $146,000,000 annually.

The first National Exposition of Power and Mechanical Engineering will be held in the Grand Central Palace, New York, from December 7-13. Though designed essentially for mechanical engineers, it includes a large number of items of prime interest to miners. Among these items are exhibits and discussions on the following: Hydro-electric power; Cottrell electrical precipitator in action, the story of coal, petroleum, sulphur, asbestos, abrasives and natural gas, shown in moving pictures. There will be, of course, an extensive exhibit of prime movers, stopers, pulverized fuel apparatus, refractories, pumps, etc.

LETTERS FROM READERS

Mr. Campbell's Letter

Editor, Canadian Mining Journal:

Sir:

Mr. C. M. Campbell, whose remarkably well prepared letter appeared in your issue of November 3rd, is a close reasoner. His arguments are depressingly convincing. They are based, however, on assumptions that, to my mind, are not sound.

In assuming that bare statistics may fairly be used to indicate the relative importance of mining (or its relative unimportance) Mr. Campbell overlooks one or two very vital considerations. Mining perpetuates itself in myriad ways that are sometimes not easy to recognize. Accretions of wealth that orginated in Cobalt are now being used to develop pulpwood limits in Newfoundland, to finance land settlement schemes in British Columbia, to endow a Canadian University, and so on and so on.

All industries are interdependent upon all other industries. When Mr. Campbell attempts to isolate and examine mining as a distinct industrial entity, he is certain to do it less than justice.

In taking exception to Dr. Corless' permissible metaphor, I fear that I discern intellectual astigmatism on Mr. Campbell's part. When he demurs at Mr. Mickle's very mild adjuration, "Let us take a chance!" Mr. Campbell forgets the plain fact that the element of venture (and of adventure) enters into all business, from the corner grocery to the colossal modern industrial merger.

Mr. Campbell has enacted the part of a brake. A brake, suddenly applied, generates heat. Continued friction involves loss of power and destruction of material. Let us hope that one application will serve the purpose fully.

Let us hope, also, that Mr. Campbell, in mobilizing his formidable facts and figures, will remember that, while statistics are useful, clear vision is indispensable.

There is more danger to-day of mining being neglected than of its being overdone.

Yours etc.

J. C. Murray

Kingston, Ont.

The Canadian Collieries Explosion

The Editor, Canadian Mining Journal:

Sir,—On page 714 of the October 20th issue of the *Canadian Mining Journal* there is an article referring to a gas explosion in No. 1 Mine of the Canadian Collieries, Vancouver Island, in which 18 men lost their lives.

In this article, mention is made of a coal-cutting machine as being of a type approved by the U. S. Bureau of Mines.

The Sullivan Machinery Company advise that this was a totally enclosed machine of a type especially built for use in foreign countries and in Canada and differing in design from the Sullivan machines approved by the Bureau of Mines. The Company further advises that this equipment did not bear the Bureau of Mines approval plate, which identifies all permissible equipment approved by the Bureau.

Will you kindly publish this explanation, in order that any impression that this machine was approved by the Bureau may be corrected?

H. Foster Bain

Director, U. S. Bureau of Mines.

Kirkland Lake

NOTES ON SOME OUTLYING PROPERTIES

(By the EDITOR)

In both the major gold camps of Northern Ontario, a great deal of attention is being paid at present to properties on the outskirts of the principal producing areas, and the promising results of exploration, both surface and underground, on a number of these warrant the belief that the productive areas will be extended to a marked degree before the present impetus to exploration is brought to a standstill.

The Kirkland Lake field, particularly, gives signs of an extension eastward that will make it much more important to Canada's mineral industry than at present. The following notes concern a number of the prospects and near-mines of this area.

The Kirkland Lake road is now in first-class shape for motor traffic as far eastward as the King-Kikland property, in the centre of Lebel township, five miles direct eastward from the town of Kirkland Lake. From this main highway lesser roads branch out in all directions to the numerous properties that are under development. At this time of year, of course, the snow provides a good road almost anywhere.

Continental

The first of the outlying properties that one encounters is Continental, stretching for three miles a little north of eastward from the Kirkland Lake Proprietary, which is astride the Teck-Lebel township boundary. On the western half of the Continental ground, north of Gull Lake, a great deal of trenching and geological mapping has been done, and a vein over one-quarter mile long, of a good size and said to contain satisfactory values, has been uncovered. The rocks are those that contain the gold veins of the producing mines to the westward, and the facturing that is considered to have induced the presence of gold-bearing solutions is said to be in evidence throughout the three miles covered by the claims. By many it is considered that these claims cover the continuation of the "main break" in the Temiskamian sediments brought about by the intrusions of Algoman times.

There is a feature of the Continental development that is interesting and highly important, thought it has to do only indirectly with the property itself. Mr. Robert Bryce, who managed the acquisition of the property, arranged the terms direct with the owners of the numerous properties involved, most of these owners being the original prospectors and stakers. These terms were more generous than those usually accorded prospectors for their finds. Payments are now being made regularly as they fall due, and, as there are no middle-men with whom it must be divided, the prospectors are reaping the maximum of benefit from their labours. It is more than likely that a large part of the money thus disbursed to the prospectors will be re-invested in further prospecting—a direct result of sound and honest promotion.

Nipissing

To the south of Gull Lake at its western end, and within the band of Temiskamian sedimentary rocks, is the ground being explored by the Nipissing company of Cobalt. No official announcement has been made of the values got in the several diamond-drill holes put down on this property; but circumstances warrant the belief that the results have been at least encouraging. This work has been done on the southern, or subsidiary "line of break."

King-Kirkland and Bidgood

At a distance of four miles eastward from the Tough-Oakes shaft of Kirkland Lake Prop., the most easterly producing mine of the camp, lie the King-Kirkland, and Bidgood properties, on either side of Mud Lake. Both these properties are in good hands, and are being developed quietly and consistently, by means of sound financing and rational mining methods. The Bidgood, to the northeast of Mud Lake, is in charge of Mr. D. Angus, and favourable reports of its progress are issued periodically. The affairs of the King-Kirkland are in the hands of Mr. Fred Jordan. Drifting on the 400-foot level is in progress at present, with results that warrant the continuance of this expensive means of exploration.

Elsewhere in Lebel Township exploration and development to date either have disproved the existence of ore in paying quantities, or have been insufficient to form a basis for decision. The Bidgood and King-Kirkland promise to make mines.

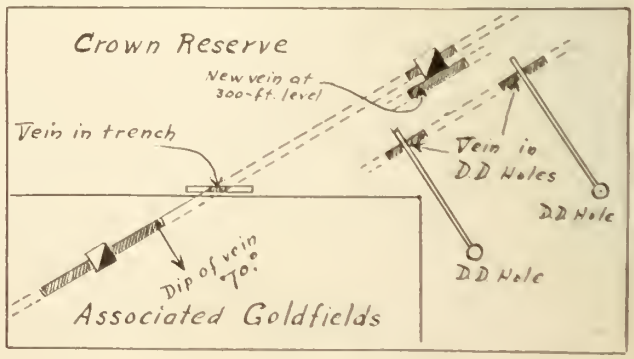
Gauthier Township

In Gauthier township, adjoining Lebel on the east, work is being conducted vigorously only on the Argonaut property, on Beaverhouse Lake in the northeastern quarter of the township. The Argonaut is a near-mine, and may make a mine. If it were not that the ore is somewhat refractory and that the vein is so badly faulted as to make mining development difficult and expensive, it is likely that the determined (though somewhat hasty and injudicious) attempt to put the property on a producing basis would have succeeded before this. As it stands, the good grade of the ore, when found, and the persistency of the vein in spite of faulting, may make profitable mining possible. The persistency of the owners in attempting to develop this isolated and somewhat inaccesible property deserves the highest commendation.

Elsewhere in Gauthier township comparatively little work has been done, and the value of none of the various prospects can be gauged with certainty. One of the most promising of the prospects is the Tobico, owned privately by Mr. George Tough of the Lake Shore mine.

Pancake Lake

The southern part of McVittie township, which adjoins Gauthier on the east (and thus is 12 miles removed from Teck township with its producing mines), covers part of the once famous and now notorious Larder Lake field. It is now known to contain, however, ore of the most promising veins of any of the outlying properties. The work of the Crown Reserve and Associated Goldfields companies at Pancake Lake, in the southwest corner of the township and



not far to the northwest of Larder Lake, has disclosed a vein not only continuous in extent, but so far as can be learned, containing high average values in gold. The vein is shown diagramatically on the accompanying sketch.

The vein strikes northeast, across the boundary line, and dips to the southeast at an angle of 70 degrees. It is visible on the Associated Goldfields property across a long stripping, on which a shaft is located. This shaft is now being sunk from the 350 to the 500-foot level according to announcement by the company. No information as to values or tonnage developed has been divulged.

On the Crown Reserve side, a trench close to the boundary showed the vein, with a good width and values. Four diamond-drill holes were put down last winter to intersect this vein, and they disclosed a vein with excellent values over a width of about twenty feet. The length of the pay-shoot has not been announced publicly. The shaft, now at a depth of 300 feet, cut another vein with good values half way down, and a second at the bottom, likewise with paying ore, neither of these two veins being visible at the surface. This property is being developed rapidly and economically under the direction of Mr. Harry Kee.

Ossian Township

Cornering on McVittie on the northeast is Ossian township, whose eastern side is on the interprovincial boundary in which there has been a recrudescence of interest since the sale of the Hurd-Fishely claims recently. The buyers are a New York syndicate, who have agreed to a price of $200,000, including a substantial cash payment. The showings on these claims, which are promising, are to be developed vigorously.

Twenty miles east of Ossian township is Rouyn township, to which the inevitable autumn rush has taken place. The existing maps show the geological formation of the gold field on the Ontario side to extend far eastwards into Quebec.

Zinc Business Conditions

DEMAND NOW RESTORED, AND OUTLOOK GOOD

BY KIRBY THOMAS

The world's production of crude zinc in 1913 was 1,117,417 short tons. Of this the United States produced 346,676 tons and consumed 295,370 tons. In the same year Germany produced 312,075 tons and Belgium 225,112 tons. A large part of the production of Germany and Belgium was exported. These figures represent the output of the smelters and do not take into account the source of the ore. The average yearly smelter production for the United States for 5 years prior to 1914 was 299,390 tons of which an average of 16,293 tons only was from foreign ores, mostly from Mexico and Canada. The greater part of the smelter production of Germany and Belgium, and of France and Great Britain (about 75,000 tons yearly, each) was from imported ores, mostly from Australia. Germany, however, had a considerable domestic production of zinc ore.

This gives a picture, in figures, of the pre-war zinc business of the world.

The war resulted in completely changing the picture. The restrictions on transportation prevented the utilization of the distant Australian ore, even to the extent of the limited smelter capacities in Europe controlled by the Allies. The Belgium smelters, except a few German-owned ones, were destroyed. The stimulus to the production of the United States was immediate and great. The smelter output of the United States in 1914 was 353,000 tons of zinc and attained a maximum of 669,573 tons in 1917. The production for 1918 was 517,927 tons, 1919, 561,713 tons, 1920, 163,377 tons. In 1917, 26,140 tons was from Australian ore formerly going to Europe, and 40,360 tons from Mexican ore. In 1921 the total smelter output of the United States was only 200,500 tons, practically all from domestic ore. This was less than the average for 5 years prior to the war by more than 80,000 tons.

These figures picture the war and post-war conditions in the zinc industry in the United States. The ore production and the metal and ore prices corresponded closely with these smelter production figures, naturally.

However, there were at no time any large surplus stocks of zinc in the United States and the supply of secondary zinc in Europe was small, compared with the secondary copper supply, and was mostly absorbed by the European demands pending the rehabilitation of the Belgium smelters and the restoration of ore supply from Australia and other countries. In consequence the zinc industry in the United States came back to a normal condition of activity very quickly with the general resumption of domestic business. Today the zinc production, demand and prices in the United States are above the average and the outlook for increased metal and ore production and high average prices is very good.

The tariff on ores on the new bill will exclude from the domestic market the cheaply produced Mexican ore and should stimulate the mining of zinc in the Missouri, Oklahoma and Wisconsin districts where zinc and lead are the principal products of the mines. In the western mines zinc is associated with lead, silver and copper ores and its production is dependent more on the general market for the other metals.

The increased demand for zinc as oxide for paint and chemical uses and for the making of rubber tires has opened a broad new market. Recently there has been an unusual demand for block zinc for the Orient, where it is used chiefly for galvanizing sheet iron to supply the demands of the new fire protection regulations introduced, especially in Japan. Part of this Oriental demand is now being supplied from the new zinc plant at Trail, British Columbia, which has been installed to treat the abundant rich ores of the western Canada districts.

The general conditions for zinc and zinc mining are greatly improved and the outlook for several years is good.

Tantalum and its close associate, columbium, are yet among the experimental metals — those which possess attractive properties but which have not yet been shown to have uses that some other and cheaper metal or alloy will not serve as well or better. With the number of new uses for the elements, their alloys and compounds that constant experimentation is developing, it is probable that for these metals also places will be found that they will fill better than any others.

Hess.

A New Process for Utilizing Feldspar

(Written specially for the Canadian Mining Journal)

For a number of years Mr. C. M. Brown, Toronto, has been working out the details of a method of treating feldspar in such a way as to make all three of its constituents oxides into commercially marketable commodities. His efforts have been successful to a degree never before obtained.

The results obtained by means of the Brown Process are of marked interest to the technical world and to Canadians generally. The operation of the process on a large scale will give commercial value to many feldspar deposits that are not now workable, and should ultimately make Canada more than self-sustaining as regards supplies of potash and alumina and their commercial compounds. The clean residue of silica that remains after treatment of the feldspar is saleable.

The process, details of which will appear at a later date, is simple and direct. It consists in the application of acid gases to finely ground feldspar, in a rotary kiln, at low temperatures. The disintegration of the feldspar is continuous and complete. The finished products are obtained by leaching and crystallization.

Theoretically potash-feldspar (orthoclase and microcline) contains 16.9 per cent. potash; 18.4 per cent. alumina; and 64.7 per cent silica. In nature, however, the potash content rarely exceeds 12 or 13 per cent., the alumina ranges from 17 per cent. to over 20 per cent., and the silica is usually higher than the figure given above. Only rare deposits of feldspar are pure enough to be suitable for use in the pottery and ceramic industries. Ordinary impurities do not affect its utility so far as the Brown Process is concerned.

The conversion of both the potash and the alumina contained in the feldspar into commercial staples is the outstanding feature of the Brown Process. The chemicals that are used either given a higher value by combination with potash and alumina, or are continously recoverable by the use of standard regenerative equipment. This, together with the avoidance of high temperature, keeps the costs down to a point where operating profits are demonstrable.

Canada is at present entirely dependent upon the United States for supplies of bauxite, the mineral from which the metal aluminium is extracted. Bauxite is also the source of commercial salts of aluminium, of which aluminium sulphate (common alum) is the most important. This salt is used in large quantities in the United States and Canada for the purification of municipal water supplies. There are numerous other uses for this and other salts of aluminium.

Bauxite is a mineral of varying and uncertain composition. As used for the manufacture of aluminium it contains from 44 per cent. to 52 per cent. of alumina, the average being about 45 per cent. It contains, as impurities, iron oxides and carbonates, silica, and titanium. The presence of these contaminants, of course, enhances the cost of treatment. It takes approximately 4.30 pounds of bauxite to make one pound of metallic aluminium.

By means of the Brown Process the 17 p. c. to 20 per cent. of alumina contained in potash feldspar can be converted either into aluminium sulphate, or partly into the combined sulphates of potash and aluminium, or partly or wholly into commercially pure alumina. In the latter form it would require less than half the quantity to make one pound of the metal aluminium as compared with the quantity of bauxite required. In addition to this, the product of the Brown Process is in every respect cleaner and more desirable.

About 600,000 tons of bauxite (the maximum output recorded for one year) is produced annually in the United States. Approximately one-quarter of this is used for chemical and other purposes. The remainder, representing about 115,000 tons of the metal, is used in the manufacture of aluminium in the United States and Canada, which together produce from 60 per cent. to 70 per cent. of the world's supply. Canada's output is about one-sixth that of the United States. As pointed out above, Canada is wholly dependent on the United States for raw material. Supplies of bauxite suitable for the production of metallic aluminium are becoming more and more difficult to obtain. A new source of alumina will change the whole character of the industry and will greatly strengthen Canada's industrial position.

Potash has never been produced in Canada in commercial quantities. Canada is bountifully supplied with potash-feldspar deposits. Despite long effort the United States has been unable to develop a domestic supply of potash. In Canada no serious attempt has heretofore been made to do so. Both countries rely upon imports from Europe. Potash, in various forms, is imported annually into the United States to the value of approximately $45,000,000. Roughly, Canadian imports amount to about a tenth of this sum. The development of a cheap domestic source of supply would increase enormously the use of potash fertilizers, and it may be noted here that from 80 per cent. to 90 per cent. of all potash imported is sold as fertilizers.

The residual silica, referred to above, has numerous uses in the arts and industries. It is believed that there will be no difficulty in disposing of it at a profit.

The results of Mr. Brown's preliminary work have been entirely satisfactory. A producing plant will be erected in the near future.

The manufacture of titanium pigments to replace white lead presents a possible, and promising, opportunity for expanding Canada's mineral industry. Some important experimental work is being conducted at present with a view to establishing on a commercial basis a process proved in the laboratory.

During 1921 China was the principal producer of tungsten ore in the world, obtained from placers for the most part. The famous placer deposits of Burma seem to be near exhaustion.

The use of molybdenum appears to be getting on a sounder footing than ever before, and the manufacturers who use it believe that as a toughener of steel it serves a real purpose when added to carbon steels in quantities reaching 03.5 per cent. It is used in automobile axles and springs and in shovels.

Even an undertaker is careful and believes in safety first. If you do not do as much he will get you sooner or later.

The Mining Districts

BY THE JOURNAL'S CORRESPONDENTS

NORTHERN ONTARIO

POWER SHORTAGE.—The power situation in Porcupine is again complicated by the fact that the Power Company has had to reduce its output by 15 per cent. due to the burning out of one of the generators at the Sandy Falls plant. This has necessitated the different companies putting their steam plants into commission. The damage will probably not be repaired until some time in December, and the company has decided to keep the reduction in effect until the completion of the Sturgeon Falls plant, which is expected about the first of January. Rains and melting snow during the past week have eased the power situation and officials now believe there is plenty of water to carry them through the winter. It is understood that the Matachewan Power Company is making arrangements to enter the Porcupine field, and has already signed up the Davidson, which is controlled by the same interests as are behind the power company. The present development at Indian Chutes, on the Montreal River, is 2000 h.p., but plans are under way to increase this to 6000 h.p. The additional installation will call for an expenditure of approximately $800,000, which will be financed by an issue of bonds. It is understood that the power line from Matachewan to Porcupine will go by way of Night Hawk Lake, and will provide power to the Peninsular.

DOME.—Dome directors have announced a re-organization plan, which calls for four shares, of no par value, being issued for each share of the present company. It is also understood that no further capital repayments will be made, but that the dividend will be increased. No special reason is assigned for the proposed change, but it is understood that the lower-priced shares will command a wider market, and will be more satisfactory to use as collateral. At the present time there are 177,667 shares of $9.00 par outstanding. During October production was $382,712, as compared with $427,000 in September. The output for the first ten months of the year, however, shows a very substantial increase and amounts to $3,178,000 as compared with $1,822,000 for the corresponding period of 1921.

CLIFTON.—Directors of the Clifton Porcupine announce that as they are unable to obtain electric power at the present time they will install a steam plant of sufficient capacity to carry on milling operations. In the meantime the present steam plant is being utilized for underground development, which is understood to be giving satisfactory results.

MCINTYRE.—Of all the Porcupine mines, the McIntyre appears to be the one that is forging ahead most rapidly. Not only is development of the known ore bodies proving them up to expectations, but new discoveries have been made. In sinking the main shaft a new vein was found at a depth of 2100 feet, where it shows a width of about 12 feet, the values running much higher than the average of the mine. This is an entirely new discovery and appears to be extremely important. On the No. 7 vein drifts on the 1875 foot level have shown practically continuous ore for 1000 feet in length, which averages $20.00 across about 12 feet. There are strong probabilities that ore will be found over a total length of 2000 feet on this vein, and that it will be more important on the McIntyre ground than it was on the Hollinger.

DEVELOPMENT PROGRESS.—The Vipond has completed its shaft to the 1000-foot level, and is understood to have opened up a new ore body at that depth. The Porcupine Crown, in the same vicinity, is sinking a winze on the new vein discovered a few months ago, from the 500 to the 600-foot level. On the 500-foot level several hundred feet of drifting was done, where results were understood to be satisfactory. The Rochester has run a crosscut on the 100-foot level for over 300 feet and has cut a promising vein. Work has been stopped for the time being, due to shortage of power. Air was being obtained from the Hollinger Mine, but in view of the power shortage this is no longer available.

PROGRESS IN KIRKLAND CAMP.—Kirkland mines are again in full swing, and are in better shape than they were before, as during the enforced shutdown, due to power shortage, an opportunity was given to make changes which will result in more efficient and economical handling of the ore. The Lake Shore shaft has now been enlarged from the surface to the 400 foot level, and the company now has a three-compartment shaft to the 600-foot level. Work is being carried on at the 400-foot level, but the 600 is still under water. During September the mill treated 1716 tons of ore, averaging $17.98 per ton, and recovered $30,865. The ore was drawn from the surface stock pile while the enlargement of the shaft was being finished. Directors have declared a dividend of 2%, payable November 15th, to shareholders of record Nov. 1st.

PROFIT FOR TOUGH-OAKES.—The Tough-Oakes, after a long profitless period and very large expenditures, is once more on a profitable basis. September production amounted to $26,600, and it is understood that the profit realized was $5,000. While this profit was small, recent reports regarding mine development encourage the belief that soon it will be substantially larger.

WRIGHT HARGREAVES.—The Wright Hargreaves is again milling at the rate of about 200 tons per day. The new vein found in the shaft at 600 feet has persisted to 800 feet, which is the present depth of the shaft, and shows a width of about 6 feet and an average value between $12.00 and $13.00.

CONTINENTAL.—A large gang of men are doing surface work on the Continental property, and while it is understood that some veins have been encountered, no information regarding assays is available. The company is, however, building permanent camps.

KIRKLAND EXPLORATION WORK.—The Boston Kirkland has been secured by the Kirkland Hudson Bay Mines, and it is understood that operations will be commenced in the near future. Development on the Hudson Kirkland has been started, and the shaft will be sunk to 400 feet. Diamond drilling on the Highland Bay has been completed, and the company is now ready to [illegible] underground developments.

Montreal-Ontario—Directors of the Montreal Ontario have decided not to start milling operations until they have broken several thousand tons on the 450-foot level.

West Dome Lake—The annual report of the Hudson Bay Mines for the year ending last August shows revenue of $12,163 and expenditures of $19,739. The property was closed down most of the year. The Hudson Bay is a large holder of the Consolidated West Dome Lake, which is now resuming operations, and officials are hopeful that this may be a substantial source of revenue for the Hudson Bay Company.

Pancake Lake—The Crown Reserve has crosscut the main vein on the Pancake Lake property at a depth of 300 feet. It is expected that it will show a total width of about 20 feet.

Nipissing Bonus—Although Nipissing production fell off in October, due to two weeks shut-down, the company is in an exceptionally strong position and is making large profits. It is anticipated that a bonus will be paid with the January dividend, the same as was done in October.

Cobalt Shipments—During the week ending November 3rd, two companies shipped ore from Cobalt over the T. & N. O. Railway. The Mining Corporation shipped 489,000 pounds of residues and the Dominion Reduction Company, 87,000 pounds of flotation concentrate.

Fatal Accident—At the Herrick property in Shining Tree, which is under option to the Tonopah Mining Company of Nevada, three men were recently killed in the shaft, due to the cross-head falling. Inspector Bartlett, of the Mines Department, investigated and found that the cross-head was not equipped with the necessary safety devices, as specified by the Mines Act, and laid a charge against both the Tonopah Mining Company and the contractor in charge of the shaft work, which resulted in each of these being fined $500 and costs.

Bogus Stock Flotation—Unless something is done to curb the extravagant statements being made by the promotors of some of the newer mining flotations, Ontario is liable to have a Blue Sky law forced on it. The mining industry, as a whole, is in an extremely healthy and profitable position, particularly the gold mines. A great deal of public interest has been shown, and as there have been very large advances in the prices of gold shares during the present year, wild-cat promoters are trying to take advantage of it, and foist a lot of worthless stock on the public. Our present statutes, no doubt, are sufficiently broad to cover this matter, but, with the exeption of the *Canadian Mining Journal* and a couple of the financial papers, no one seems to be giving it any attention. This sort of thing hurts the legitimate mining industry, because with a large proportion of these stocks the purchaser has little or no chance of realizing any profit from his shares, while the legitimate mining industry is called upon to bear a part of the blame for the fraud.

NOVA SCOTIA

Disagreement within Union—There is a row of first-class dimensions in progress in the Nova Scotia district of the United Mine Workers between International and District officers. It appears that at the last meeting of the International Board Members held at Indianapolis, President Lewis asked Board Member Barrett why the Nova Scotia union was allowed to call out all the maintenance men, leaving the pits in danger during the August strike, after he had wired instructions to keep this class of labour at work. Board Member Barrett laid the blame on the District officers. Another matter President Lewis wanted made clear was that of the proposed union of District 26 with the third Socialist International. Both President Livingstone and Secretary McLachlan say that this is their own business. President J. L. Lewis disputes the point and may insist upon the repudiation of this connection with European extremists. If so, there will be "something doing" among Nova Scotian miners. It will be a pitched battle between those that uphold the U. M. W. constitution and those, like McLachlan, who want no restriction. We bet on President J. L. Lewis to win. He has both Cumberland and Pictou counties with him to begin with, and a host of quiet, thoughtful men in Cape Breton. If the quarrel develops, the coal companies would be well advised to keep out of it until it begins directly to affect their interests.

Mr. Wolvin's Tour of Inspection—While President Wolvin said very little on the occasion of his recent visit of inspection to the steel works and collieries of Nova Scotia, the changes that have taken place since then are indicative of a very searching inquiry into the state of the British Empire Steel Corporation's practical affairs. Whether he found things to his satisfaction, no one here seems to know. Evidently we are in for a "shuffle." Mr. E. P. Merrill, general manager of the steel works, has been transferred to the steel sales department in Montreal, and other changes will follow. While no one has been appointed yet to Mr. Merrill's late position, the name of Mr. F. W. Gray, assistant to vice-president MacDougall, is commonly mentioned. Should Mr. Gray be appointed to this position, it will meet with general satisfaction not only here in Nova Scotia, where he is known and respected by all, but throughout Canada, where his unusually clear grasp of the coal situation has brought him prominently before the public notice.

BRITISH COLUMBIA

Granby—Operations of the Granby Consilidated Mining & Smelting Co. are to be quite extensive in the Portland Canal District of British Columbia this winter. The Company has taken over, in addition to the Outsider group situated on the Canal, the Sunshine property on Glacier Creek. On the latter it is the intention to do a considerable amount of tunnel work. With 200,000 tons of ore (according to report) already blocked out on the Outsider it is confidently expected that development of the mine with a strong crew of men will continue in the spring.

Salmon River—Pat Daly, veteran mine operator, has taken a bond on the Yellowstone group in the Upper basin and proposes floating a company to take over and develop the property.

Portland Canal very Active—It is anticipated that work will proceed on some 12 or 13 properties in the Portland Canal District this winter. Nine of these are on the Salmon River, four of which, the B.C. Silver, Indian, Big Missouri and the Premier, are on the British Columbia side, while the other five, the Fish Creek property, being operated by the American Mining & Milling Co., the Titan, Riverside, Daly Alaska, and Alaska Premier are on the Alaskan side of the boundary. There are six active properties on the Bear River, viz., the Prince John, the Dunwell, Sunshine, Mimico, Mobile and the

Silver Bell. The Idaho on the Marmot River also is being worked. Two of those mentioned, the Sunshine and the Outsider, the latter situated on the Canal, have been taken over by the Granby Co. The same Company has acquired the George group on the Bear River which it is the intention to develop extensively. On the majority of the properties referred to, with the exception of the Premier Mine, where some 225 men are employed, the average crew members about 10 men. The American Mining & Milling Co. on Fish Creek, however, have a larger force engaged and are looking forward to making regular shipments of high-grade ore over the snow. The activity of the Granby Co. in the Bear River section has given rise to speculation as to the possibility of opening up the Portland Canal Railway. If a sufficient tonnage of ore were assured to warrant this it would mean the more rapid development of many promising prospects.

W. G. Norrie Lowenthal, Mining Engineer, has been inspecting some mining properties in the Alice Arm and Hazelton Districts, Northern British Columbia.

A Nelson Prospect—Mrs. Kate McAvoy, the woman pioneer prospector of the Kootenay, reports that the Taft group at Erie, near Nelson, is developing satisfactorily. Two tunnels have been driven, one running southeast for 100 ft. and the other due west 80 ft. She states that in the former the values run up to $61 a ton in gold over a width of 3 feet, while the lower tunnel shows consistent value of $18 a ton.

Mine Taxation—Representations are being made to the Provincial Government for some changes in the Taxation Act in so far as it is applied to active mines. A short time ago a deputation met the Hon. John Hart, Minister of Finance, on behalf of the Britannia, Granby and Surf Inlet Mining Companies. It was claimed that some more equitable system might be adopted in the assessment of such mining properties as those enumerated. It was pointed out that at present provision is made for a gradual reduction of the assessment as the mineral is recovered. The deputation was assured that the matter would have careful consideration.

A meeting of the Mine Owners' Association of the Interior of British Columbia was held recently at Kaslo, when a resolution was passed urging that in the taxation of mines more consideration be given to the depletion of values in the course of mining. Messrs. Randolph Bruce and T. J. Bogay were appointed to meet the Hon. Mr. Hart and outline to him the views of the association. The annual meeting of the Association is to be held on December 6th at Nelson, B. C.

A Sandon Prospect—A 2-foot vein of ore has been uncovered on the American Boy at Sandon. A small force has been working on the property for the past couple of months under the foremanship of John Vallante under whose guidance the Standard Mine at Silverton was developed to the shipping stage.

Copper near Nelson—Optimistic reports are being received regarding the possibilities of the Monarch group of mineral claims situated at Beasley on the south slope of a mountain rising from the Kootenay River and about 9 miles west of the city of Nelson. M. P. McDonald recently examined and has submitted a report on the property, which indicates that it has every chance of becoming one of the big copper producers of the west. In brief it is stated that the development to date indicates that there exists a mineralized zone of at least 1000 ft. in width, northeast by southwest with a strike northwest by southeast, crossing three full claims of the Monarch group. Mr. McDonald's sampling shows returns of about $13.80 a ton. The property is well situated, being close to the water, within easy reach of the Trail Smelter and having near at hand the power of the Kootenay Power and Light Co. It is understood that capital now is being obtained with a view to pursuing further development.

Trail Ore Receipts—For the last ten days of October the ore receipts at the Trail Smelter, Consolidated Mining & Smelting Co. aggregated 12,011 tons. Three new names appeared among the independent shippers, viz., the Meteor and Hampton both of Slocan City, with 12 and 23 tons respectively, and the Atkins of the Republican Camp, Washington, with 44 tons. Other shippers over this period were Alamo, Alamo 44; Forence, Princess Creek 95; Knob Hill, Republic, 110; Quilp, Republic 323; Rambler-Cariboo, Rambler 35, Standard, Silverton 417; Silversmith, Sandon 308; Sally, Beaverdell 35; Whitewater, Retallick 27; Company mines 10541. This brings the total receipts at the smelter up to the end of October to 351,078 tons, which is considerably in excess of the average of past years.

Britannia Power Contract—A contract has been entered into between the Britannia Mining Company and the B. C. Electric Railway Co. under the terms of which the Railway company is to supply from 1500 to 6000 horse power for mining operations of Howe Sound. A high tension line will be built immediately from North Vancouver along the Coast to Britannia, a distance of 30 miles at a cost of $150,000. It is stated that the Britannia Company decided to adopt this method of obtaining power for the reason that lack of water at certain seasons made it necessary to consider the building of extensive storage works in order to assure the continuous operation to the mining plant now in course of installation. The alternative was to acquire the power of the B. C. Electric and as the contract has been signed it may be assumed that it was found this more attractive both as to service and as to finances.

B. C. Iron Steel Plant—The project of the establishment of an iron and steel industry in British Columbia at present is in abeyance. One third of the cost was to be covered respectively by the Imperial, Dominion and Provincial authorities. Hon. T. D. Pattullo, Minister of Lands, returned a few weeks ago from England and is quoted as saying that the political upheaval there is likely to interfere with negotiations.

NEW DOMINION REPORT ON COAL

A comprehensive review of the coal industry in Canada, covering the three years 1919-20-21 is given in a report issued this week by the Dominion Bureau of Statistics. The solution of Canada's coal problem depends in no small measure on the availability of reliable information on the subject and the report just published, containing 116 pages of tabular matter showing in detail the output by collieries, the imports of coal by ports of entry and the exports of Canadian coal, will do much to meet this need. Several tables are given descriptive of the organization and progress of the coal mining industry with particulars regard to the capital investment, plant equipment, men employed, time worked and tonnage lost. The report contains a chapter in which the Dominion situation is reviewed and there are also separate chapters dealing with the industry of each of the coal producing provinces.

It is pointed out that the apparent consumption of coal

in Canada varies between 30,000,000 and 35,000,000 tons annually, of which approximately one-half is imported from the United States. Canada exports between 2,000,000 and 2,500,000 tons of coal each year. According to the report there were 396 coal mines in active operation in Canada in 1921 working over an area of 713,000 acres.

The total capital invested in the industry at the close of the year was $176,991,495, of which $77,000,000 was invested in Nova Scotia; $53,000,000 in the mines of Alberta; $41,000,000 in British Columbia; more than $3,000,000 in Saskatchewan and over $1,000,000 in New Brunswick.

The coal mining industry in Canada gives employment to approximately 30,000 men and the wage bill for 1921 amounted to $42,758,471. In addition to this amount $3,717,238 was paid to salaried officials numbering about 1,600 in all.

The report is the most comprehensive review of coal statistics that has been published by the Dominion Government. Copies may be had, free of charge, on application to the Dominion Bureau of Statistics, Ottawa.

The Sullivan Machinery have just issued Bulletin 70-Y describing Sullivan Valveless Stoping Drills. These Stopers are available in two patterns, light weight hand rotators, dry or water, and automatic rotating machines, either dry or wet type. The automatic rotator is equipped with a new air throttle control of the admission of the air to the feed cylinder, by means of which the advance of the drill is retarded to suit the requirements of drilling, or stopped entirely, as in spotting a hole, passing through a vug or on striking softer ground, by merely pressing a lever attached to the main throttle. The water drill of this type has one throttle for air and water and discharges the water jet through the hollow drill steel at the back of the hole to lay the dust of drilling.

40,000 TONS OF COAL REQUIRED TO MAKE ONE OFFICE BUILDING

In an address in Washington last week, Dr. George Otis Smith, Director of the Geological Survey, gave his audience a graphic description of the importance of coal to our modern civiization. He instanced the modern office building in which the Coal Commission has its offices. From observation of this particular building while it was going up, a rough formula has been deduced that can be applied to almost any modern office building, as follows: Take by weight 60 parts of gravel, sand, and crushed stone, 58 parts of tile and brick, 27 parts of building stone, 19 parts of cement, and 16 parts of steel, with much smaller proportions of copper, glass, asbestos, paint and tar.

Yet there is another mineral ingredient that enters into every one of the building materials, an invisible but essential component of the structure -the coal that helped to quarry and dress the stone, to smelt and fabricate the metal, to burn the cement and tiles and brick. And while the formula calls for 27 parts of stone, the most conspicuous constituent of the building, it had been necessary to use nearly three times as much coal to produce all those raw materials and make them ready. Nor is this structural coal—37,000 tons of coal for the Interior Department Building— the whole of the contribution of coal, for it took perhaps another 3,000 tons of locomotive fuel to assemble all these mineral products from mine and quarry and fabricating plant, for no less than 22 States contributed the structural materials that went into this Federal building in Washington.

This is typical of the material side of modern civilization. Truly, it is dependent to a degree that few of us have realized upon that common, dirty, and now costly bit of earth's crust — coal.

INDEX TO MINE AND MILL SUPPLIES

Addresses of advertisers, whose names appear in the following classified index, may be found upon reference to their advertisements. An alphabetical index to advertiserswill be found on the page facing the inside back cover. The following regulations apply to all advertisers:—One-eigthpage, every issue, three headings; one-quarter page, every issue, six headings; one half page, every issue, twelve headings; full page, every issue, twenty-four headings.

Buyers who are unable to find in the classification heregiven such machinery or supplies as they desire are invited to write Service Dept., Canadian Mining Journal, Gardenvale,Que., who can in all probability, refer them to proper sources.

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Ball Mills:
Engineering Equipment Co., Ltd.
Herbert, Alfred, Limited
Holman Bros., Ltd.
Hull Iron & Steel Foundries, Ltd.
Mine & Smelter Supply.

Ball Mill Feeders:
Engineering Equipment Co., Ltd.
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Holman Bros., Ltd.
Hull Iron & Steel Foundries, Ltd.
Mine & Smelter Supply.

Ball Mill Linings:
The William Kennedy & Sons, Ltd.
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Mine & Smelter Supply.
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Canadian Link-Belt Co., Ltd.
Jones & Glassco (Regd.).

Belting:
Gutta Percha & Rubber, Ltd.

Belting — Silent Chain:
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Jones & Glassco (Regd.).

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Standard Underground Cable Co. of Canada, Ltd.
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Hendrick Manufacturing Co.

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The William Kennedy & Sons, Ltd
Peacock Bros., Ltd.

EDITORIAL

It is well that outsiders should know that the [Canadian Mining] Institute is not for the benefit of speculators or mining manipulators, but was established, and is maintained, for the advancement and protection of the genuine mining interests of the country. — *G. R. Smith* — 1907

THE INSTITUTE'S USEFULNESS

Inertia is the worst foe of progress. In certain respects the Canadian Institute of Mining and Metallurgy has become inert. Therefore the current discussion on "Institute Policy" has much more than its intrinsic merit. Even for its own sake, however, it deserves the closest attention of those members who have a genuine interest in their Institute. By their active participation in the discussion, or by the attention with which they follow the progress of the debate, can the true interest of members in the Institute be gauged.

In his paper on "Institute Policy" read before the Western Annual Meeting in Vancouver last week, Mr. Mackenzie provides concrete proposals and definite statements round which a fruitful discussion can be made to centre. We print today his summary of the paper, with the Institute's charter appended.

While we agree heartily with Mr. Mackenzie in his determined effort to secure for the Institute a definitely formulated "forward policy" that will call for continuous and constructive effort on the part of members, and while we are convinced, as he is, that the Institute must retain its original status as representing Canada's mining industry, still we differ from him in some of his deductions, and would map out a somewhat different course of action for the years to come.

There is no doubt that the Institute can do most for the progress and final direction of the mining industry by continuing to be its public representative. This was the chief cause of its creation and constitutes the keynote of its charter. The charter wisely provides latitude for expansion and ramification by means of by-laws consistent with itself. The founders of the Institute claimed no extraordinary prevision, and formulated in the charter only a broad policy, which is sound now as then.

During the quarter-century of the Institute's corporate existence the practical direction of Canada's mining industry has passed gradually into the hands of technically trained engineers, the bulk of whom are now registered as Professional Members. The professional conduct of these engineers, and accessions to their ranks, are subjected to no systematic scrutiny and are subject to no control outside the purely formal addition of their names to the Institute's list of professional members. This is not as it should be. Mining engineers deserve a status in the general community that they do not possess at present. They can gain this status only by the concerted effort characteristic of a professional society. They must have this society.

Mr. Mackenzie assumes that, in order to effect this end through the agency of the Institute, its status must be changed from that originally intended to that of a purely technical society. We do not agree. There is an alternative, which we have pointed out before in these pages. The present section of Professional Members, already constituted, can be made to serve all the legitimate purposes of the technical society without interfering at all with the general aims and activities of the Institute. If there should arise a conflict in the aims of this section of the Institute and those of the general body of members, then there is available immediately the means of settling the dispute. It were far better to have the two classes of representatives of the industry in intimate contact and, in general, working unitedly toward their common end than to have two bodies in separate organizations.

This solution of the problem disposes of the objection that technical status is contrary to the intention of the charter and the charter members. The charter expressly provides for developments such as we have proposed, by means of by-laws. We hold that "to encourage and promote these [mining and metallurgical] industries by all lawful and honourable means," it is now expedient to regulate the practice of mining engineering by means of an association of Professional Mining Engineers. The Institute offers an immediate and effective means of doing this.

To conduct effectively the affairs of such a professional association will require much more than the scant ten dollars now paid annually by members of the Institute. It will be worth more. At present [illegible] worth little or nothing to be enrolled as a Professional Member. As soon as these Professional Members shall have been constituted into an active professional association, professional membership will be worth a fair

ther sum. Thus ean the proposed activities of the professional section of the Institute be supported without imposing a financial burden on the parent body.

As for the seope of the Institute's activities when an active section of Professional Mining Engineers shall have been inaugurated, it is obvious that it will inelude all that is in prospect now, with the addition of the provisions that are advocated so ardently by a large number of Western members. Our present proposal is, so far as the Institute is concerned, eonstruetive and not restrietive.

This is not a new idea. It is the idea that impelled the movement for the registration of professional members in the first plaee, years ago. The idea has, meantime, been lost sight of. We wish to bring it into view once more.

LAKE ST. JOHN AS ELECTRO-METALLURGICAL CENTRE

The mooted development of the huge water power where Lake St. John diseharges into the Saguenay River brings to mind the question of how the power resources of the Lake St. John district, which constitute one of the principal natural resources of that district and form one of the largest undeveloped sourees of power on the continent, are to be made a source of income. The smaller and more easlly developed falls of the neighborhood will always be suffieient to serve the needs of the pulp and paper industry and of the normal urban eommunities. Unlike Shawinigan Falls, it is too far removed from any industrial area in the United States to allow of the profitable export of power. There is at present no warrant for the belief that general industrial activity of sueh dimensions as to require a million horsepower will ever be centred round Lake St. John or the Saguenay, or even round Quebec, whither the power could be conducted economically. It would seem that electro-metallurgy must remain the chief reeourse for its use.

The principal raw materials in electro-metallurgical processes are minerals. Coke and limestone give ealcium carbide, acetylene, acetic aeid, acetone, and a host of derivatives, including eordite when neeessary. Quartzite is the basis of ferro-silicon manufaeture in the electric furnace, and magnesite of metallie magnesium. There are a number of such processes well established, that are available for industrial applieation where conditions are right. Cheap eleetric power is the essential condition. Other processes wherein eleetricity either replaces another form of energy formerly used, or makes possible the production of a new material, are being evolved with remarkable rapidity. It seems probable, for instance, that the economic production of electrolytie iron and sulphur from pyrites will be accomplished within a short term of years. So the possibility of utilizing the Lake St. John power in large amounts is growing rapidly.

The Lake St. John district has been explored for minerals in only the most desultory way. The chief resource disclosed so far is titaniferous iron ore, which is available in amounts far in excess of the quantities suggested in reports by the Quebec government. Large deposits of feldspar have been loeated along the upper Saguenay river, and there is no doubt that vast amounts of this mineral would be disclosed were there any incentive to a thorough search. Limestone, of a sort, and clay are available along the south shore of the lake.

With its abundance, or indeed superabundanee, of water-power, its seaport hard by at Chieoutimi, and its routes of travel radiating from Lake St. John and the upper Saguenay, this district is a most attractive one for eleetro-metallurgieal development, though this development may be delayed until power near the front is in use and until the prospeetor's seareh discloses mineral deposits that will eomplete the list of natural resourees required.

A TAX ON PUBLIC RESOURCES

"At the present time [coal] mine workers are receiving a seale of wages far above that paid in other industries, with the result that the workers in these other industries are paying tribute to the mine workers. Continuation of such a condition cannot fail to have disastrous results upon the anthraeite industry, and therefore upon those employed in it."

In these words do the General Committee of Anthracite Operators of the United States epitomise the fundamental fact of the relation of their industry to its workmen and of both to the public. These two sentences are part of a preliminary statement to John Hays Hammond, chairman of the United States Coal Commission, in response to his invitation to submit data and suggestions, which we published in full on November 3rd. These leaders of the anthracite industry are unequivoeal in their denunciation of a condition that is eeonomically and morally unsound. This unsound eondition affeets Canadians in almost the same degree that it does Amerieans. We are paying tribute alike.

The statement of the anthraeite operators is an admirable document, broad in its scope and lucid in its presentation. It does not, of course, discuss the ways and means whereby the consumers of anthracite coal are compelled to pay tribute to them, (the operators). That question is left discreetly in the back-ground. We hope it will be brought into the centre of the picture before the Coal Commissiou's activities are ended. But the operators' committee have done a distinct service in pointing out so clearly the fact that the anthracite miners are even now a parasite class in the community, since they receive for their labour more than they earn.

This question of the wages paid to anthraeite miners touches the majority of Canadian householders very

nearly at present, since they depend upon anthracite fuel. We hope it will be of much less concern to them within a short term of years, when Canadian sources of domestic fuel will have been developed and used more largely. But the general problem of specially paid classes of labour, subsidized at the expense of all others in the community, will remain. Within our borders, the case of bituminous coal miners deserves our immediate attention.

At present the coal miners of Canada, both east and west, are receiving all they earn—in some cases in the west, possibly more than they can earn. The daily rate of pay in the east does not need to be so high as in the west, both because of the differing values of the dollar in the two localities and because the Nova Scotia miner is able to work more days in the year than the westerner. So long as the western miner's inability to do a full year's work is beyond his own remedy, his partial support by the rest of the community is his due. But it would be wise for the consuming public, thus forced to bear the financial loss due to seasonal mining of coal, to examine the case carefully, to see whether or not this expense can be avoided.

Three weeks ago we pointed out that the executive of the miners' union in Alberta, had given notice of a demand for a six-hour day and a five-day week. Since then the executive of the miners' union of Nova Scotia has followed suit. How far these United Mine Workers' officials are backed by the rank and file of the miners, and what part of their demand they expect to enforce, we have no means of finding out. It seems possible if not probable that the demand is in the nature of a manoeuvre. Nevertheless the fact of the demand demonstrates a point of view that not only contravenes the dictates of justice, but is in direct opposition to the principles of democracy. Our population in general is already paying a very heavy tribute, in the way of excessive and unearned wages, to the organized railway workers and a number of lesser classes of unionized labour. Let us see to it that those who mine our coal are not added to the ranks of those licensed to draw more from the common fund than they put into it.

EDITORIAL NOTES

It has been proposed recently, and at intervals before that, to abandon the publication of the Annual Transactions of the Canadian Institute of Mining and Metallurgy in favour of the monthly periodical. It is interesting to note in this connection the complete statement of "objects" in the original constitution of the Institute. They are (as published in the volume for 1897),

(a).—The publication in one volume of the papers and proceedings of the organizations of the federation.

(b).—Action upon such matters affecting or relating to the mineral industries of Canada which may be referred to it by the societies in the federation. It may be noted that the national Institute was inaugurated as a federation of several provincial mining societies.

Excitement grows apace in oil circles as the first of the wells in the Contts-Sweetgrass area of southern Alberta nears its goal. High hopes are founded, with substantial warrant, on what this area will disclose. We hope that, in case a flowing well should result, investors of all degrees will keep their heads to a reasonable extent. The ground round about that gives even the slightest promise is already being held in anticipation of a successful outcome.

The glaring, and obvious, advertisements of shady and bogus mining shares have decreased to a remarkable extent during the past week or two. We hope that all the activities of those who paid for these advertisements have been curtailed in like degree. It is highly satisfactory that the Ontario government is to make a serious attempt to enforce the laws against the sale of illicit mining stock.

THE LYE DIRECT

(That epileptic fits can be simulated by the simple expedient of masticating a little soap, is a matter of common knowledge. In the painful episode hereunder narrated, without colour, the chief actor involuntarily gave a practical demonstration of the efficacy of soap in this respect.)

Out in a Western mining camp
The shift-boss gets an awful cramp.
He hustles to the cookhouse, where
He starts right in to cuss and swear.
He asks the cook for something hot;
The cookee grabs a great big pot,
And ladles out a cup of stuff
That looks like it was strong enough.
The shift-boss swallows it right off,
And then begins to gag and cough;
And then he yells for drinking water,
His eye plumb full of blood and slaughter.
The second he takes water in
His serious troubles sure begin:
For bubbles, large and small, by Jim!
Starts rippin', rushin', out of him.
Bubbles as big as footballs came,
They's others will confirm that same.
It takes about a hour or so
Before them bubbles cease to blow.

* * *

It turns out, after some enquiry,
(In which the shift boss acts some fiery)
That cookee has mistook his dope—
He's served the shift boss hot soft soap.

J. C. M.

Letters From Porcupine--III

WITHIN THE CHARMED CIRCLE

There is much that points a moral and adorns a tale in the recent history of the Rochester claims, which abut the Hollinger on the northwest corner of that property, and lie immediately to the east of the town of Timmins. After the Nipissing syndicate had given up their option on the Rochester, it became more or less of a drug on the market. It required a certain amount of courage to resume work on an abandoned property, especially in the face of the ill-concealed antagonism of the major gods and godlets.

However, Mr. F. C. Loring, than whom there is no more consistently cheerful taker of fair mining chances, took matters in hand last summer and interested English capital (good sporting capital it is) in the development of the Rochester.. In the working arrangement entered into Mr. Loring and Mr. "Tom" Flynn were prime movers.

Sinking was stated on August 2nd. Early in October the shaft was down 110 feet, and a cross-cut from the 100-foot level had been driven 130 feet south to cut veins whose existence had been proven by diamond drilling.

The shaft was started in typical basalt. At a depth of 70 feet the characteristic Porcupine schist was encountered. At 90 feet a 10-foot quartz vein, having the same dip as the schist, 70° N., was cut. At about 150 feet south in the cross-cut a vein showing much visible gold came in, contrary, I believe, to the expectations of any but Messrs. Loring and Flynn and two of their coadjutors. What has happened since then I do not know. I have written this to show that spirited and intelligent exploration is almost bound to be rewarded in the long run.

The British Porcupine Development Company, which is Mr. Loring's concern, controls 52 40-acre claims scattered pretty well all over Tisdale township. In addition to the work being carried on at the Rochester, the company has three diamond drills at work at widely separated points. A "strike" on any one of the numerous properties controlled by the company will justify the expenditure on all.

This, I think, is an excellent example of well-directed prospecting. Every week and every day of progress heightens the chances of success.

I believe that the *Canadian Mining Journal*, if it will forego preaching for a jiffy, will join with me in wishing all success to this venture.

* * *

In one point there is uniformity in milling practice in the three large plants of Porcupine. Precipitation of gold from cyanide solution is effected in all three plants with zinc dust. At the McIntyre mill zinc boxes were given a trial and were quickly abandoned. In all three mills lead acetate is used to aid precipitation.

There is wide divergence in refining methods at the three plants. At the Hollinger the raw precipitate is smelted in blast furnaces; the bullion is brought down with lead; the lead is driven off in standard cupellation furnaces, and a bullion of 950 total fineness is obtained.

At the McIntyre the raw precipitate is treated with sulphuric acid and melted in a carborundum-lined, tilting, reverberatory furnace. The bullion here is brought to a total fineness of 900.

The practice at the Dome consists in treating the precipate with sulphuric acid, calcining and melting in small clay-lined graphite pots in a reverberatory furnace. The fineness obtained is from 990 to 995.

All this is a wonderful and fearful contrast to the refining carried on in the old-fashioned stamp mill. I can well remember pouring water over the neck of the old mercury retort, also the unpleasant symptoms of incipent salivation.

It is likely that the roar of the stamps, by the same token, will be a forgotten sound in Porcupine within—well—say, a short time. That's vague enough to be perfectly safe. But the stamp is an illogical and power-wasting contrivance at best. It is a strange and anomalous survival. In the last ten years it has lost much face. Experience at Porcupine has contributed not a little to the stamp's approaching relegation to oblivion.

* * *

Referring again to Porcupine milling practice, some incidental changes in the flow sheets are extraordinarily interesting. For instance, the use of Hudson's Bay blankets on the lower ends of amalgamating plates at the Dome mill was a distinct improvement. In due course of time these costly items were superseded by a cheaper and more suitable material, wide strips of "silent felt" the stuff in common use between the linen tablecloth of civilization and the mahogany table.

Another instance is afforded by the supersession of pebble grinding at the McIntyre by the use of steel slugs in the place and stead of the pebbles. A slight increase in cost was compensated for by greater tonnage and a much more uniform product.

Another change in practice at the McIntyre resulted in reducing the consumption of zinc from 0.20 pound per ton of solution to 0.05 pound per ton of solution.

Other instances almost without number could be cited. They all go to show the well-nigh priest-like devotion of the mill superintendents. The simile would not hold for a minute if the reader could hear some language that I have heard when all is not well with the mill.

J. C. MURRAY

TITANIUM ALLOYS

To Canada, with a large part of the world's available titaniferous iron ore within her borders, developments in the uses of titanium are of considerable importance. The uses so far determined consume only a comparatively few tons a year of titaniferous ore, the chief of them being "magnetite" electrodes for arc lamps, in which ground ilmenite is admixed with other ingredients, and ferrocarbon titanium, used to an increasing extent to de-oxidise and de-nitrogenise steel in the ladle just previous to casting. Titanium has a marked affinity for these two elements, and it is found that the resulting particles of slag are so highly fluid at the temperature of the molten steel that they rise immediately to the surface, coalesce, and are removed.

The Bureau of Mines, Washington, has published a bulletin, serial number 2406, "Titanium", describing the titanium alloys at present in use, ferrocarbon titanium, ferrotitanium, cuprotitanium and manganotitanium. It can be had on request.

Institute Policy*

..SUMMARY OF PAPER BY G. C. MACKENZIE..

In presenting a summary of my paper entitled "Institute Policy," I would ask for discussion of the following points:—

(1) *For what purpose was the Institute organized?*

The Institute was organized for the service of the allied industries rather than for the service of the allied professions. I submit that the Charter (our constitution) contains no clause relative either to the service or to the qualification of members and, therefore, neither the personal benefit nor status of members is provided for by the Charter. I also submit that the first clause in the Charter cannot be considered the most important clause simply because it happens to be the first. If, as it is claimed, precedence denotes importance, then we must conclude that the maintenance of a central reference library is of more importance than the encouragement and promotion of the allied industries, which is absurd.

We may, therefore, conclude that the Institute was organized in the service of the allied industries and was to be composed of persons who were interested in the promotion of these industries.

(2) *Is it possible for the Institute to acquire technical status under its existing Charter?*

The election and classification of members is controlled by the By-Laws. The first By-Laws adopted in 1898 were drawn up in conformity with the ideals expressed in the Charter and contained no reference to the classification or grading of members. These By-Laws have been amended from time to time by an active minority who, losing sight of the fundamentals expressed in the Charter, have attempted to give the Institute a measure of technical status. Admitting that this active minority has been actuated by the highest motives, it nevertheless was attempting constitutional changes without the necessary formality of amending the Charter. We have now reached a point where the first By-Laws, drawn up in conformity and in parallel with the Charter, have been so altered that the original parallelism is destroyed and the ideals of the founders, as expressed in the Charter, are in danger of being lost altogether. Therefore, the attempts at grading membership with the view of acquiring technical status, under the existing Charter, may be described as a process of veneering, because there is no established constitutional foundation upon which such grading could be based.

(3) *Are the ideals of our founders, as expressed in the Charter, of sufficient importance to be retained and upheld?*

To contend that what the founders had in mind in establishing the Institute is unimportant, is to admit that the meaning of the Charter is of no consequence to us and that we are now out of sympathy with the objects of the founders. If we *can* adopt that attitude, the way is clear and we may proceed to change the Institute constitutionally so that it shall become a professional organization possessing, in time, a definite technical status. But it is believed that the majority of members are *not* out of sympathy with the ideals of the founders, and that they *do* value the historical record of the Institute in so far as it has given expression to those ideals.

(4) *What can be expected from re-organizing as a professional society?*

In the first place we may expect that the total number of members forming such a society would be less than half the present membership of the Institute, because the number of professional men presently engaged in the mineral industry of the country is approximately half the present membership roll, and it cannot be assumed that all of these men would support a strictly technical society.

In consequence of this reduced membership, and because the functions of such a society would be limited to ideals of professional duty, the annual revenues, unless augmented by increased membership dues, would be absurdly small.

We know that it has cost the Institute annually an average of $13.40 to carry each member through the twelve years 1910 to 1921, and we also know that members have averaged an annual contribution of $8.18 in dues, toward that expense.

The number of members contributing dues throughout the twelve years averaged 1024 yearly. It is, therefore, obvious that if we reduce the number of members we must increase the dues of each member if the Institute's expenses are to be met.

The difference between the average annual cost per member and the average annual contribution per member throughout the twelve year period was $5.22. This amount accrued annually to the Institute as the result of activities apart from the performance of any professional functions. If, then, we limit the functions of the Institute to the service of the professions we may expect that revenue from sources, other than annual dues, will decline. It will, therefore, be apparent that if such a re-organized society is to apply its revenues in the service of the professions on a scale approaching the past activities of the Institute, its schedule of dues must be considerably higher than the present annual dues of the Institute. Taking all factors into consideration, I submit that annual dues of not less than $25.00 would be required.

The principal function of such a technical society would be the holding of meetings for the reading and discussion of papers and the furtherance of acquaintance and goodwill among its members. Bearing in mind the small membership and with appreciation of the size of the country and the distances separating our mining centres, we may feel confident that these meetings would be characterized by a very limited attendance.

If the re-organization of the Institute on a technical basis is to result in largely increased dues and poorly attended meetings, the Institute will have sold its birthright for the expensive luxury of [illegible] expensive in more than one sense. [illegible] cannot qualify for membership, and [illegible]

*Published in full in November issue of Monthly Bulletin of the Canadian Institute of Mining and Metallurgy.

will be quick to see the significance of class motive and will look upon such a re-organized society as a close corporation, a society that places service to its members before the service which it owes to the industries that gave it birth.

(5) *What can we accomplish by amending the By-Laws in conformity with the Charter and adopting a national and democratic policy that places service to the allied industries before all else?*

There are many things which the Institute should strive to accomplish in the service of industry. The holding of meetings at which all component sections of the society may be represented; the equipment and maintenance of divisional machinery; the prompt printing of all Institute papers and the distribution of information concerning our mineral resources through the medium of the Monthly Bulletin. These are a few of the duties of the Institute, and yet we find that but one of them, the printing of the Monthly Bulletin, is beyond our resources at the present time.

The membership roll of the Institute has grown at the rate of 45 members per year during the twelve years 1910-1921.* This laborious and painfully slow growth has been due to either one of two things, (a) A narrow and restrictive policy or (b) An industry too weak to support a larger membership.

Our industry is not weak; it is comparatively young and subject to many of the ailments of youth, but, compared with other basic industries of the country, we know that it occupies a position second only to agriculture. Therefore, the only logical conclusion is that we have been following a mistaken policy.

By amending the membership By-Laws so that they shall again conform with the purpose of the Charter, the Institute will have demonstrated that it still holds to the ideals of its founders and is no longer to be swayed by motives of class interests. We shall then, *with all honesty*, be able to say that the society welcomes every class of reputable citizen to its ranks, not because of any personal benefit that may accrue to them, but because of the opportunities offered by aiding and stimulating industry through the medium of Institute membership.

Having taken that step, the problem of increased membership will solve itself, and with increased membership will come, in time, the ability to render a real and tangible service.

If the Institute will revert to the ideals of its founders, honoring those ideals in their performance, it will have found itself, and once it has found itself, we may be confident that it will become an active and important factor in the development of our mineral resources.

*The increase during the war period was at the rate of 61 members annually.

CHARTER OF THE CANADIAN MINING INSTITUTE

An Act to Incorporate the Canadian Mining Institute

[Adopted by Parliament of Canada in 1898]

Whereas the persons hereinafter named have, by their petition, represented that an association known as the Canadian Mining Institute has been founded by the said persons, and others, for the following purposes, namely:

First, to promote the arts and sciences connected with the economical production of valuable minerals and metals, by means of meetings for the reading and discussion of technical papers, and the subsequent distribution of such information as may be gained through the medium of publications. Second, the establishment of a central reference library and a headquarters for the purpose of this organization. Third, to take concerted action upon such matters as affect the mining and metallurgical industries of the Dominion of Canada. Fourth, to encourage and promote these industries by all lawful and honourable means. And whereas the said persons have prayed that it be enacted as hereinafter set forth, and it is expedient to grant the prayer of the said petition: Therefore Her Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:

1. John E. Hardman, George M. Dawson, William A. Carlyle, Charles Fergie, John Blue, B. T. A. Bell, A. W. Stevenson, James McArthur, Archibald Blue, William Hamilton Merritt, F. T. Snyder, Henry S. Poole, Wilbur L. Libbey, Rogert G. Leckie, Clarence H. Dimock, Geo. E. Drummond, Geo. R. Smith, J. Obalski, John J. Penhale, R. G. McConnell, Frank C. Loring, John B. Hobson, and William Blakemore, together with such persons as hereafter become members of the Institute are hereby incorporated under the name of "The Canadian Mining Institute," hereinafter called the "Institute", for the purposes set forth in the preamble.

2. The Institute may acquire and hold such lands and property as are necessary to carry out the objects and purposes for which incorporation is sought; provided the annual value of the real estate held at any one time for the actual use of the Institute shall not exceed five thousand dollars.

3. The Institute may make such by-laws, not contrary to law, as it deems expedient for the administration and government of the Institute.

4. The affairs and business of the Institute shall be managed by such officers and committees, and under such restrictions touching the duties and powers of such officers and committees as may be described by by-law.

5. The head office of the Institute shall be in the city of Montreal ,or in such other place as may, from time to time, be determined by a vote of two-thirds of the members of the Institute.

PROGRESS AT BLUE QUARTZ MINES

Recently there was reported from the Blue Quartz Mines on Painkiller Lake, six miles northeast of Matheson, Ontario, the discovery of an additional ore-shoot as the result of underground development. Samples of this ore are of unusual richness. It is not known publicly what are the milling grade or the probable dimensions of the new ore-body. A number of promising veins had been encountered previously, and in a hand-picked lot of rich ore approximating half a ton in weight, the Temiskaming Testing Laboratories at Cobalt determined a value of $246. per ton.

The development of this property under the present management has been pursued vigorously and honestly. Mr. H. C. Crow, president of the company, returned from England recently after arranging for the provision of the funds necessary to determine and to develop ore-shoots, and to build a mill when its construction is warranted.

Reports from Fort Norman, in the far north on the Mackenzie River, reveal that the early winter has not checked drilling for oil in that territory. The original well at Fort Norman of the Imperial Oil Company is still producing seventy barrels a day and this fluid is found of great value locally.

That the increasing demand in Eastern Canada for the product of Manitoba's granite producing industries will bring about rapid development of these industries, is assured. Both red and grey granite has been taken out during operation of the quarries within the last two years, and it is expected the industry will develop rapidly since a market has been found in the East.

Safe Explosives

THE EVOLUTION OF EXPLOSIVES PRACTICE IN THE COAL MINES OF CAPE BRETON

by JOHN MOFFATT

The use of explosives plays a large part in opening up coal mines and in the production of coal. Without them development would be slow and the work of breaking down coal very laborious and costly. There is abundant evidence of this in the cases of collieries which, owing to heavy gas outburst or explosions, have prohibited the use of explosives and yet continued mining. In the year 1891 an explosion occured in Springhill, causing the death of 126 persons. An investigation disclosed that the cause was due to a blown-out shot in a dry and dusty section of No. 1 mine. By common consent of both the employer and employees, explosives were abolished from Springhill collieries and up to the present time they have not been used, except in the new mines lately opened up. The great depth and overhead pressure of the older collieries now renders their use unnecessary. The work of mining, however, was at first very hard and although the ton rate was increased yet it scarcely compensated for the added labor in wedging down the coal. Many other collieries since then have had the same experience. Cassidy colliery, near Nanaimo, B. C., is one of the latest to which our attention has been drawn and the fact that a delegation of miners approached the Provincial Minister of Mines and protested against the new order prohibiting the use of explosives in the Cassidy colliery, and argued for "the judicious use of powder" shows the value placed upon its aid in mining coal.

The Use of Black Powder

Many of the smaller and a number of the larger explosions were long ago traced to the use, and sometimes the abuse, of black blasting powder. It was an everyday occurrence to see the working face at the time of blasting lit up by a sheet of flame, especially if holes were overloaded and the room was dusty. This was followed by thick clouds of black smoke, which added to the dense darkness of the mine and caused one to grope his way along. If ventilation was poor, this smoke filled the chambers all day long and men breathed it and became slowly poisoned by inhaling carbon monoxide and carbon dioxide gases. In the dry and dusty sections, it was not uncommon to see a heavy shot which had by its concussion thrown the dust into suspension, set fire to it and run along, burning for two or three hundred feet. The writer knew a happy little Englishman, who every day of his life sang just as blithely as the "Miller of the Dee", and while working in a dusty section told almost every evening of the fires occurring in his bord and pointed to his singed whiskers and hair as proof. But one day he, with many others, was missing and when found his body was burnt beyond all recognition. A blown out shot, a dusty section and an explosion told the whole story. But men were slow to learn, and even after it was proved beyond doubt that the use of black powder was dangerous and laws governing its use were enacted, these were not strictly enforced and infractions were frequent.

My Experience With Black Powder

Scientific investigation led to the discovery that in a badly ventilated bord the gases left by the firing of loose powder are inflammable and will, under certain conditions, explode. This knowledge had slowly filtered into enquiring minds. Mine officials, while not absolutely prohibiting the simultaneous firing of several shots in the same bord to guard against an explosive mixture, began to frown on the custom. The writer was then a shotfirer and a student of mining, and had been in the habit of firing the two side shots of a bord immediately after the middle shot was fired. Second reports began to be heard after the shots had gone off. These were common, but were attributed to the gases liberated from the coal when the shot was fired. Having read shortly before that about the inflammable nature of the gases left by the exploding of black powder, the dust created in the breaking down of the coal and the high ignition temperature at the time of explosion, and also about the high temperature of the gases remaining in a badly ventilated bord, I began to understand the danger of this practice and decided, except for experimental purposes, to discontinue it. One bord further in than the other along the airway gave very heavy second reports. Having satisfied myself that the theory of inflammable combustion from black blasting powder was correct, I decided never again to fire two shots at the same time in the same room. I had been in the habit however, of loading both holes at the same time and of leaving the needle in the second one until the first one was fired. One day two leading officials of the mine came in just as I was about to fire the first shot. As miners usually do on such occasions, I sat down and we had a friendly chat. Being in miners' "cutty sark", I was cold when they left to go out. Without thinking of what I was doing I drew the needle of the second shot and lit the two squibs. Suddenly it dawned on me what I had done. I knew what would happen and I ran to gain the shelter of the first crosscut and reached the next room, but the after report blew doors open away down on the level road and made such a loud report and such a shaking through that section that the officials came running back to see what had happened. To their enquiry I replied that it was only a second report and these men, though in official positions, were satisfied with my answer. Last some present official, seeing this, should have any perturbation of mind, let me assure him that both officials are out of the business long ago and one is beyond the "weeping", if not the "smiling". For me, after that, black powder had its dangers and when later on pellet powder began to be introduced, I welcomed it.

Pellet Powder

Here, however, began a new experience. Custom in the use of handling loose powder had led to carefulness, although now and then accidents occurred. But with the introduction of pellet powder a large number of miners were burnt by the careless handling of this explosive. It appeared so harmless and was found to be so handy that it could be slipped into the coat pocket or the shirt breast and be hidden there until a careless smoker thrust his hot pipe inside and there [illegible] resentment and an accident.

These pellet powders had some of the characteristics of loose powder and flaming continued on blasting. Finally, by agreement between miners and employers, a test of the different kinds was made. It was found that all flamed more or less. The worst were eliminated

and the safest was selected to be used only until such time as permissible explosives could be introduced. The collieries had reached such depths and were now subject to such conditions as called for the best explosives. No one disputed this, and the "permissible" came in with the welcome of a friend.

Permissible Explosives

The mining law of Nova Scotia not only recognizes the worth but the dangers of permissible explosives, and has regulated their use as follows:

"No explosive other than a 'permitted explosive' shall be used for blowing coal in any mine unless permission to use some other explosive is given in writing by the Inspector and the Deputy Inspector of the district in which the mine is situated, and no explosive shall be used in any mine except in accordance with the following regulations:

"It shall not be stored in the mine, or within two hundred and fifty yards of the slope or shaft, or any place not approved of by the Inspector, provided that the storage of permitted explosives shall be allowed near the mouth of the shaft or slope of a mine in such quantity as may be required in the mine for one shift, in a building to be selected by the Manager of the mine and approved by the Deputy Inspector, and further provided that detonators shall not be stored in the same building.

2. "It shall not be taken into the mine except in a secure case or canister containing not more than six pounds.

3. "There shall not be at any time in any one working place more than one of such cases or canisters."

The conditions under which it shall be used and the supervision of its use are all carefully regulated, if not by law then by special rules drawn up and agreed to between the management and the miners of each colliery. These rules vary according to the conditions underground. If the mine is shallow and free from gas, loose powder may be used, but if it is deep and gaseous nothing but permissible explosives is used.

A permissible explosive is one that has passed certain tests and has been authorized by the Minister of Mines to be used in a gaseous or dusty mine. But it is not permissible unless used in the manner specified by the Department. Most permissible explosives have the general character of high explosives and all are entirely different from black blasting powder in composition and action. They give a shorter flame, explode more quickly and are much more powerful. The average miner is inclined to believe that flame is entirely absent when permissible explosives are used. This is a mistaken notion.

Three explosives in common use in the collieries of Nova Scotia are Monobel No. 1, Viking No. 1 and Polar Monobel No. 3, their composition being as follows:

	Monobel No. 1	Viking No. 1	Polar Monobel No. 3
Nitro Glycerine			
Poly-Glycerine	9.5 to 7.5%	11 to 9%	11 to 9%
Ammonium Nitrate	70 to 66	61 to 57	60 to 57
Wood Meal	9 to 7	10 to 8	10.5 to 8.5
Chloride of Sodium	16 to 14	21.5-18.5	20.5 to 18.5
Carbonate of Calcium			1.5 to .05
Carbonate of Magnesium		1.5 to .05	
Moisture	2 to —	2 to —	2 to —
Charge limit	10 ounces	26 ounces	34 ounces
Velocity of Detonation	8950 ft. per sec.	7718 ft. per sec.	per sec.
Pendulum Swing	2.81 inches	2.44 inches	2.47 inches 6600 ft.

The Charge Limit means that only that weight of explosive can be used in any one shot hole at one time with safety. The Velocity of Detonation shows how quickly combustion takes place when the explosive is detonated, and the greater the velocity the more shattering will result. The Pendulum Swing is a measure of strength, therefore the greater the swing the stronger the explosive.

The composition of the permitted powders shows chloride of sodium, which is often spoken of as the cooling salt. When explosion takes place great heat is liberated and the chloride of sodium checks both heat and flame, as much heat is spent in reducing this salt to steam and the steam produced also checks the flame.

The compositon of black blasting powder is:—

Sodium nitrate	75%
Charcoal	15%
Sulphur	10%

Rapid action and rapid cooling are the principles on which the safety of permissible explosives are based. Practice has demonstrated the principles as sound, for mine fires rarely occur where these explosives are used.

Trained Shot Firers

Following close on the heels of the permissible explosive came the certificated shotfirer. This class does the same work as is now done by the shotfirers of the United States. Since then the Nova Scotia Government has seen fit to discard the name shotfirer and now all shotfiring is done by the examiner. In reality the shotfirer must be an examiner, for "no shot can be fired without first making examination of the place to be fired and the places contiguous thereto."

Just as discipline came with the introduction of the safety lamp, so the education of the miner began when permissible explosives were introduced. It was plainly seen that if all miners were permitted to charge their shots there would be much overloading, much smashing of coal, and increased danger. There was then much unskilled labor in the collieries, so a new system had to be devised which placed all shotfiring under the care of expert miners.

Systems of Shotfiring

There are two systems of shotfiring in the Cape Breton collieries, the mixed system, where shotfiring is carried on by day when men are in the mine, and the single system, where shooting is all done by night when all men are out of the mine. Each system has its advantages and drawbacks. When it was decided, in the interests of safety, to have all shotfiring done by night the miners entered a strong protest, pointing out the inconvenience and the loss of time it would cause to miners and the consequent loss of output to the mines. One mine, however, adopted the system of firing by night and it was found to be a great success. The one thing that it did determine was when coal is shot down by night and a report made of the number of places containing coal with the quantity in each place, the management knows just how many men are needed to fill the coal and how many cutters are required to mine it, and it became a rare thing at that colliery to see men coming out of the mine for want of something to do. It had the opposite effect from that expected and pointed out by the miners. There was no inconvenience, no loss of time and no reduction of output.

Another advantage it possesses is that the shotfirers and their helpers, who charge and fire the shots, can

begin to shoot in that part of their sections close to the return airway, which carries off the fumes and dust. This gives a purer atmosphers to work in and to the old miner turned shotfirer who long ago breathed powder smoke all day long, it is very much appreciated. This system has not, however, become general and in a colliery working two consecutive eight-hour shifts it is an impossible system.

The mixed system does not tend to a maximum of safety. It has, however, the advantage that under the supervision of expert men the miner does all the work of getting the shot ready and in this way a larger number of men are being gradually trained and educated to the proper use of explosives. The shotfirer does not load the coal and has no desire to break it up. Shots are fired one at a time when the miner wants them, and the risk from firing large quantities of explosives within a short tie is lessened. The mine atmosphere is never heated and overloaded with powder fumes and better examination can be made after the firing. As a system it is more flexible and readily lends itself to the new conditions that constantly arise in a coal mine.

Selecting Explosives

As coal differs in texture, some kinds being open and others being compact, experiments are necessary to find out the explosive best suited for blasting. A number of these were and are still being carried on in the Nova Scotia collieries. After examining the records, the explosive giving the best results was selected. Permissible explosives were in this way established and although the first explosive used was long ago discarded and many others tried since then, it has been found that the texture of Cape Breton coal is such that the same explosive gives good results over the entire field. Miners through practice become expert in the use of any explosive and no change should be made, unless it is necessary. Any change in explosive is immediately noticed by the miner, who having no knowledge of the strength and action of the new explosive, may make bad shots and much small coal. It is in the interest of the management in case of the necessity for a change to inform the miners and shotfirers, giving them all the data they have obtained from the manufacturers.

During the war the supply of British explosives was cut off and a new supply had to be found on this side. For a time there was much vexation of spirit and many bad and missed shots, but when the cause was explained it was agreed to carry on and do the best possible until practice had been made perfect.

Tamping Still Necessary

The stemming of holes charged with black powder had become a fine art in early days and few miners failed to do this. The hole was stemmed as hard as it could possibly be. If not, a blown out or windy shot, endangering the lives of all in the mine, might take place or else the coal would not be broken down as desired. A loosely tamped hole required a heavier charge of powder and when miners pay for explosives costly methods must be eliminated. But somehow when permissible explosives were introduced, it got into the mind of miners that, these being high explosives and of the nature of dynamite, tamping was not necessary. The more expert miners soon discovered the difference and tamping was carried on as usual. In place of the heavy copper headed tamping bar a light wooden rod is now used which serves the purposes well. Some miners thought that loose tamping close to the charge gave better results than firm tamping all the way through. But all soon discovered that solid tamping was necessary. For this purpose and to ensure safety, moist clay is sent into each mine and placed close to the working faces. Tamping with loose coal is strictly prohibited and all who attempt this dangerous practice are sent out of the mine. The charge of a shot which misses fire cannot under the law, be drawn. A new hole placed at a safe distance from the loaded one must be bored.

Electric Detonation In Use

The magneto battery and electric detonator are used in Cape Breton collieries. The detonators are in charge of the examiners and are carried into the mine by them. Electric cables are used to set off the shots. Only one shot is fired at a time in any one place. When the shotfiring system was first introduced and the electric battery came into use, several bad accidents occurred to miners, who, to help the shotfirer, stayed in the place and connected up the cable with the detonators. Failing to see the miner in the distance and thinking him gone out of the place by another way, the shot was fired and the miner either killed or badly injured. This is against the rules of the mine, and is heavily penalized.

Permissible explosives, because of their power and rapid action, make a larger percentage of coal of small sizes than black blasting powder. This has been the general experience in the coal mines of the American continent. Because of this the cost per ton of the output at the mine mouth is higher than if a slower and weaker explosive were used. To find some such explosive, experiments are being constantly carried on under the supervision of engineers of the mines in conjunction with the manufacturers. It is a big problem and presents many difficulties, but the engineers who have succeeded in producing an explosive that has greatly reduced the risk of mine fires and explosions will, no doubt, succeed in finding an explosive capable of giving as good or better results than black blasting powder.

Additional Precautions

Complaints are frequently made by miners of bad powder. This usually occurs in winter when the temperature is low. This has been remedied by the removal from the general magazine to a warmer building of a quantity sufficient for a shift. All electric blasting caps are tested before being given out. This is to prevent misshots, which are a loss to the miner and the mine's output. It sometimes happens, however, that the Inspectors from the works where the powder is made have to be called in and consulted before the real cause of complaint is removed. This only happen when the miner and his manager are unable to agree as to the seat of trouble. Special tests at the working face are then made and are carried on until satisfactory results are obtained.

Miners have been known to refuse to use a superior explosive because of some slight accident in its normal use. Forcite Gelatins, because of their slower action and lesser fumes, are preferable for underground rock work. They are less bulky and more plastic than nitroglycerine dynamites and can be got to the bottom of holes where the explosive does most good. Yet the [illegible] Wabana iron ore mines, because of prejudice, [illegible] persuaded to give up dynamite for Forcite. Ammonia explosives are not, however, permitted [illegible]

The use of Canadian calcium carbide in India is increasing rapidly.

News and Comments

BY ALEXANDER GRAY

"Possibilities" of Shining Tree

In effect and to the purpose, Dr. Harvey W. Weed tells the owners of Shining Tree district properties to go to work; that "all that is needed" is "underground development" He confirms the judgment of Ontario's own geologists that the country has "possibilities" Guardedly optimistic, as scientists must be in the circumstances, he considers it "probable" that the right sort of development "will open up ore bodies of considerable extent and milling values." Incidentally he admonishes those most concerned that high-grade, "bonanza" ore in small quantities is of "minor importance at Shining Tree as it was at Porcupine." That exceptional condition need not "discourage deep work, because it is the universal experience that the medium and low-grade ore body makes the more reliable and longer lived mining camp."

Otherwise, the law of averages is paramount. Dr. Weed expresses confidence in the "attractive possibilities," which is all-sufficient provided those who claim to have "another Hollinger" and so tax the limit of credulity, get to work. Crescendo literature will not make mines. Shining Tree owners are aware of this. Shining Tree is eleven-year-old and the "possibilities," like the "Blue Bird," were there all the time. However, it is reassuring to have Dr Weed go on record that he is "quite favorably impressed." The Henderson "Holding"-Universal Tool Steel aggregation of golden areas should modulate its representations accordingy

Indian Mines, Portland Canal

Toronto and Montreal men of means with knowledge of the case are obtaining encouragement from their Indian Mines undertaking in the Portland Canal country. They have an arrangement by which they take stock as they go along, and ultimately, if development continues satisfactory, they will have control. A considerable amount of work has been done. Much of it, of an exploratory character has resulted in disclosing ore of profitable grade. While the section is belived to present several veins, the management under Mr. Hurner, with Mr. Clothier in supervision, wishes to confirm this. An upper tunnel was in 162 feet early in the current month, and Mr. Clothier reported the ore body had widened to 15 feet 6 inches, with ore on both sides of the drift. At the time of writing Mr. Clothier said the management was feeling for both walls. The average of the vein across the face was stated to be $17.50. In a few days it was hoped to reach the section vertically beneath a high-grade surface showing. In a raise Mr. Clothier said there is ore averaging $25 across 20 inches. The lower tunnel, 150 feet vertical fom the upper, is thought to be on another vein system, according to Mr. Clothier. There again, good values have been obtained. While the respective workings have yet to be lined up, those concerned in the ventnre are proceeding upon the assumption that the property is outgrowing its prospecting equipment.

London Quotations Wanted

Taking note of the editorial comment upon the desirability of London quotations for more Canadian mining shares, those of us who have trodden the speculative wine press in Throckmorton street and "between the chains" in in ye olden tyme in Johannesburg—who saw the bourse and boersen bubble and boil over—registered a smile. For several leap years a few of us fogies have cherished the hope that London would develop a more than casnal interest in Canadian precious metal mining. and take a larger share in standard issues.

London, though, has been a law unto itself. It has chosen to remain on the ragged edge of Canadian mining things. What it took of Cobalt, apart from the Townsite, was unproductive. Of course, it has the Aladdin, and the residuary rights in the Chambers-Ferland. The Keeley it retains, and has no reason to complain. At Porcupine it has the Davidson, and it has interests at Matachewan and in Shining Tree; but it turned down the McIntyre, forfeited its holdings of Hollinger (aside from what the Anglo-French people retain), and it is recent history that the Northern Ontario Exploration and Porcupine Development companies of Bewick-Moreing are now the Goldale, under Lewisohn auspices. One outstanding Group, perhaps the most important of all in South Africa, tentatively proposed to entertain part of what now is Hollonger Consolidated. The owners delicately intimated that their idea of the value of the ground did not coincide with the London-South African view.

London has a substantial holding in the V. N. T. At Kirkland Lake it has the Kirkland Lake Proprietary and blocks of Lake Shore. It has title to Gull Lake, and is looking for unearned increment. The Ankerite was conditionally recommended to a London group, and was not availed of. The same group had a piece of the Rea, and dropped it. Prof. Frecheville and Mr. Tyrrell have been on the spot. The latter never faltered in his faith in certain of the Porcupine properties, but the London interest in them is negligible.

We were told, a while back, that a London Securities concern had taken an option on "Hattie" shares. The Latilla group has been active at Cobalt and Kirkland Lake. Not all could be accomplished that this group aimed at. London prefers the "Bingo." At Elbow Lake the London Exploration Company took on an area. The short option and initial payments required resulted in abandonment of the enterprise.

This recital need not be laborious. Londoners of experience would rather "make their own script." They have been indiscreet, and occasionally incorrigible, declining to invest in established shares but accepting the problematical. Undoubtedly London quotations would attract attention. More important is the need of discriminating London capital and a clearer conception of the potentialities of Canada's precious metal areas.

Undoubtedly the basis upon which London capital was sought has precluded equitable arrangements. That, however, need not prevent more than spasmodic interest, where the situation is broadening and prospects more than ever attractive. Besides, the second-storey front is safer than something reached by the rear or by the alley.

Nipissing Directors Warn Shareholders

"Grafting" must be easy or else the grafters must be in desperate plight when brazen members of the profession make hurried appeals to holders of shares in reputable mining companies to sign their certificates in blank and send them along in order to obtain participation in other issues. Hollinger directors promptly notified their shareholders to be on their guard against separationist gangs. Nipissing directors also have found it necessary to circularize their shareholders. Evidently the business of robbing the too-confiding of what is worth having, and substituting what could not have merit, is being extended. Washington authorities are taking note of this. It used to be oil stock.

Now it is new-fangled mining schemes and radio propositions. It behoves both the wary and unwary to keep the padlock on their susceptibilities.

The Geological Mentor Ruminates

The Sage of the Slide was sententious, as becomes one eminent in his profession, when it was suggested that the porphyry has been mineralogically munificent. "Don't forget the Algoman Granite," he said. "You hear a lot about the porphyry, but the porphyry has to be considered in relation to the Algoman; and we have been slow in realizing that to the fullest extent. The Algoman is the source of the gold and the cause of the porphyry occurrences, which give us those contacts which are worth staking and exploiting. We have to be Calvinistic in these matters, accepting both Genesis and the Revelations. Wherever there is a strong Algoman development and the genetically related porphyry, I have maintained we are going to find minerals beyond the ken of Canadian men of wealth who appear to be oblivious of these features. Quebec? of course it will have old fields —not one, but four or five, in my judgment from observation of the Algoman masses. Only one of the five may be of great importance, but it does not follow that more of them will not offer gold mines. Wherever there are contact conditions under the circumstances, I believe Canadians with working capital should devote some of it to the exploitation of the country's mineral wealth. The latest Quebec gold area has the geological essentials. Now we should leave nothing undone to explore the contacts. I don't mean to say that every porphyry outcrop is going to prove a profitable prospect. Isolated patches of porphyry are not what we want. Around the confines of the Algoman intrusions is where we are going to find gold fields, just as we have in western Ontario, Porcupine and elsewhere. Rouyn Township should provide mines. Boischatel also is good. In other sections I know the Algoman presents opportunities. Our important men of means ought to display their confidence in the country, which we are at least beginning to understand. Demonstration of our wealth must not be left to those least able to do all that is needed. In this way, by having large investors do the initial financing, we could avoid much of the mischief wrought by indiscriminate promotions."

Hitch In Asbestos Deal

The Johns Manville interests are to have their new large mill fully equipped according to the best practice in the no distant future. The site of their fabricating-on-the-spot plant is located, and its construction will go ahead in due course. But there is a rift in the lute as to the acquisition of certain other property. The information is that drilling has stopped, as well as other work. Montrealers, in stickling, are said to have injected flies into the ointment.

Strong Position Of Zinc

In contrast with the inadequate copper market, zinc producers find their metal in a very strong position. Were costs lower (but they cannot be) producers would be more willing to operate on a larger scale. They are awaiting a further advance in the market before they increase their output. By that time stocks on hand will be inconsiderable. The current market quotation is 7.35 cents a pound at East St. Louis, which is an advance of a quarter cent in the week ended the 11th. Shipment continue heavier than production. As there was only 18,043 tons on hand on November 1st, and the business doing is at the highest rate in two years, it is easy to see that the Consolidated Mining & Smelting Company, and others in the west, are experiencing prosperity. Had the Federal Zinc people been given a small measure of official support during the past two years, Gaspe might have been in the running now with bulk production.

BOOK REVIEW

ELEMENTARY GEOLOGY, with Special Reference to Canada A. P. Coleman and W. A. Parks — J. M. Dent & Sons. London and Toronto—363 pages, illustrated.

For the better part of a century the geological history of Canada has been the subject of study and of systematic record. A few students, professional geologists, in our country are familiar with this record, vast though its dimensions have now become. A larger number, mainly economic geologists and mining engineers, have studied all available data regarding special areas of industrial importance. There remains a very large number of Canadians who would like to know the gist of our country's geological history and its present geological appearance that have, heretofore, not found available a text suitable for their purpose. This want has now been supplied.

Professors Coleman and Parks of the University of Toronto are too well-known throughout Canada, and particularly in eastern Canada, to need any introduction in these pages. Their book is a welcome addition to our technical literature, and promises to become as well and favourably known as are the authors. It is written with admirable directness and simplicity, as befits the work of accomplished teachers, who have, withal, spent most of their days with Nature.

Wherever possible, the text treats of Canada. We have within our borders a sufficiently wide range of rocks to illustrate the geological scale of time almost in its entirity. In many cases it is, of course, expedient to treat the North American continent as a whole, and in this we find our Canadian authors in agreement with the principal findings of the best-informed geologists of the United States. There are few of the 197 illustrations that are not Canadian, and readers from coast to coast will find among them pictures of local interest. Dr. Coleman's own field researches have supplied a large fraction of them. A distinctive feature, and one that is relatively new, is the series of outline maps showing the distribution of the principal geological rock formations throughout Canada. This is accompanied by a second series showing the conformation of the land surface of North America during the successive eras when these rocks were laid down in the adjoining seas.

The book is in two sections, the first, on Physical Geology, describing the mineral constituents of the earth's crust; the way these mineral particles are joined to make rock masses or strata; the agencies that wear down the land surface distribute and again collect into rocks the particles, and the observable phenomena and unseen processes that are usually included under the term Structural Geology.

The second, and larger, section deals with Historical Geology. The making of the world, and then the successive stages of Canada's history from primordial times are presented by means of the evidence afforded today on the surface of our land. The [illegible] of plant and animal life of the successive eras and periods, which ordinarily monopolizes the space available is here kept within reasonable bounds, more or less with its true relative importance in the story, though it still has a prominence that is hardly its due.

The writers have (contrary to the practice of numerous writers of geological texts recently) avoided

the mistake of giving undue prominence to those particular fields of research in which they have specialized. They have also moderated in large degree the use of multifarious and unnecessary geological terms that mass so much of the writings of geologists on this continent. We would suggest, for future editions, a still simpler technical terminology. On several pages interested readers will find shrewd controversial thrusts on disputed points—but Dr. Coleman has pressed only with a very admirable moderation this advantage, and prerogative, of the writer of books.

The book is dedicated by the authors to the use of the general reader and persons engaged in the mining industry in Canada. We would add students of elementary geology in our colleges, and can recommend it most heartily to them all.

LETTERS FROM READERS

Canadian Iron Ores

To the Editor, Canadian Mining Journal.
Sir,

Kindly permit an old contributor to the Journal, to dispel a mist that has darkened the vision of old and young, of interested and less interested persons in the eastern part of our country, in regard to the economical value of our iron ores for so long. . . .

It is known that we have in our two western districts of Ontario alone over 300 miles of continuous deposits, principally magnetite, and about one-quarter of that hematite. These deposits are so extensive and varied that from them we could supply the whole world for centuries. This is no exaggeration for we can prove that diamond drill holes put down to a depth of 1000 feet did not reach the bottom. And if we use the figure furnished by our stratigraphical geology, we may claim for them a depth of over 10,000 feet, while the width is in most parts of the range 1400 feet.

The dimensions quoted are those of a range which have been thoroughly propected and is accurately known the length of which has been ascertained to be over 100 miles.

Using the above figures for arriving at the cubic ore contents of this one range alone, we are confronted with a tonnage which would stagger the imagination. Now we have three iron ranges, the middle range is the one just mentioned, while the northern is the most extensive.

Most of our ores are magnetites of two distinct classes, one jasper banded and the other an intimate mixture of gangue and iron oxide particles. Now since the ore is magnetite and easily attracted by the magnet, can anybody claim that it needs serious study and experimentation to determine whether it is of use for technical requirements? It will take no more time than it will take to make a general analysis of the crude ore and one of the concentrates. The preliminary concentration test is done with a simple instrument, which I constructed over 20 years ago, and is extensively used now in the metallurgical department of the University of Minnesota. . . .

I have had repeatedly the visits of the engineer of the Babbitt concentrating plant, and guided him over a part of our Mattawin Range, from where he took large samples, and returned home more than delighted, yes, astounded at what he had seen. Please ask him, Mr. Editor, if there is indeed a problem to solve, as your recent article in the Journal would indicate. In conclusion let me make you and your readers aware that the Babbitt concentrating plant in Northern Minesota, which handles daily 4000 tons of run-of-mine ore, is situated at the south end of our Mattawin Iron Range, and treats there a low-grade magnetite from 26 to 30% iron content without the slightest difficulty.

The average iron content of *our* ore is 37.72%. Do I need to say anything about the Swedish and Norwegian ores, which are of the same quality as ours, for which they have even ventured 230 miles inside the Arctic Circle, where one company alone, the Sydveranger, is treating 1,800,000 tons yearly? And is it necessary to mention the many Swedish plants that have operated over twenty years now, every ton of whose product is eagerly taken by English and German Iron Works? I am sure you have also heard of the Pennsylvania and New York concentrating works. Should all these plants not offer sufficient material for a determination what to do with our own ores?

Don't let us give our Canadian engineers such a degrading "testamonium paupertatis" under the guise of lack of experience, not to possess the same intelligence and ingenuity as others to determine what can be done with Canadian natural resources.

All that the uninitiated in this branch of industry have to do is, to go and study what other people are doing. There are absolutely no puzzles to solve. If you have sufficient ore of your own, examine it closely, take it with you in your laboratory, test it, see whether your magnetic apparatus will separate the iron from the rock particles, and in what fineness; don't disintegrate it more than it is necessary; then make your concentrating test, and analyse the products; lastly, find out what is the most convenient way to agglomerate the concentrate; of the several methods in vogue, select the best adapted for your conditions; the rest is a commercial proposition.

Port Arthur, Ont. F. Hille

TALC AND SOAPSTONE IN CANADA

A report just published by the Mines Branch, Department of Mines, under the above title, deals with the talc and soapstone resources of Canada. The author is High S. Spence, and report comprises 80 pages of text, 17 illustrations and a map showing the distribution of the known talc and soapstone occurrences in the Eastern Townships of Quebec.

The report contains four chapters: Chapter 1 includes tables of analyses of tales and soapstones, notes on the distribution of the Canadian deposits, and a statistical section. Chapter 2 is devoted to detailed descriptions of Canadian talc and soapstone mines and occurrences; while Chapter 3 deals with the uses, mining and preparation for the market of talc and soapstone. Chapter 4 contains brief notes on talc in foreign countries. A bibliography of the more important literature dealing with talc and soapstone is appended.

From this report, it appears that while talc is known to occur in Nova Scotia, Quebec, British Columbia and Ontario, the last named province is the only one that has figured at all prominently as a producer.

The Nova Scotia occurrences are small and are not regarded as of economic importance. Quebec undoubt-

edly possesses important talc deposits, most of them yielding an off-colour grade of ground talc, which, however, has good slip and should be of value for the paper, roofing and foundry trades. A similar grade of talc is produced at several localities in British Columbia; and there is, also, in this province a deposit of cream coloured steatite, or massive talc, that shows some promise and that may with the improved transportation facilities afforded by the Castle-Windermere highway, prove capable of development.

The principal talc mines of the Dominion lie in the vicinity of Madoc, north of Belleville, in Hastings county, Ontario. The Gillespie mill at Madoc station has been in operation for the past sixteen years, and produces a superfine, white talc that is much in demand by the talcum powder, textile, paper, soap and rubber trades. Two other mills in the same district have been in intermittent operation for the past ten years.

According to the statistics of production given on page 13, the production of talc in Canada in 1920 amounted to 21,000 tons, valued at $167,000. Virtually the whole of this quantity was derived from the Madoc area, Ontario.

LARGE DEPOSITS OF RADIUM ORE DISCOVERED IN AFRICA

Lower Prices due to Discovery of Deposits

The national observance of "Cancer Week," when public-spirited men, most of them physicians, have shown anew the tragic seriousness of cancer, has again turned attention to radium as one of the principal agencies for coping with that appalling scourge. Radium is not a specific for cancer, for which there is no specific, but it has repeatedly proved to be of very great efficacy in the treatment not only of cancer but of some other diseases.

Almost simultaneously with Cancer Week, according to the United States Geological Survey, Department of the Interior, there has been a great drop in the price of radium; instead of the former price, $120,000 per gram (about 15.4 grains) of elemental radium, the price now advertised is $70,000 per gram.

A considerable reduction in price preceded this drop, because several manufacturers had on hand large stocks of radium, which, owing to the present financial conditions, were not sold readily. The recent great drop, however, was not due to this cause—it was due to the discovery in Katanga, in Belgian Kongo, of large deposits of very rich, easily worked radium ores and to the erection of a plant at Oolen, Belgium, about 40 miles from Antwerp, for producing radium from those ores.

Location of The Deposits

These deposits are at Luiwishi and Kasolo, near Elizabethville, in the extreme southern part of Belgian Kongo, and consist of veins on the property of the Union Miniere du Haut-Katanga, a British-Belgium company operating huge copper-bearing properties in Katanga. The veins carry pitchblende, which is in large part altered to gummite, uranophane, and other uranium minerals. A subsidiary company has been formed to extract the radium, and a considerable quantity of ore carrying many times as much radium as the carnotite ores that have heretofore governed the world's markets has been shipped to Belgium. No data are at hand, however, to show that in the aggregate the newly found deposits will eventually yield as much radium as the deposits in the plateau region of the United States, though a considerable quantity can be produced from the Katanga deposits at a much lower cost, and it is that cost that is ruling the radium market to-day.

Recognizing the value of cooperation, American companies, closing down their own mines, have undertaken to market the African product, and radium is therefore now offered at a price lower than any that has prevailed since it became an object of commerce, and an opportunity is thus given to branches of government, hospitals, doctors, and philanthropist to obtain the precious material at a minimum expenditure, for it seems probable that the price will go no lower. Eventually the principal source of radium will again be the carnotite deposits of the West, and when that time comes, if not before, the price will again rise.

The State of New York and the city of Philadelphia have each bought 2 grams of radium for the use of their cititzens, and the province of Quebec has bought 1 gram. It is hoped that other municipalities, States, or countries will buy radium at the present advantageous rates, particularly as the work done during Cancer Week is likely to occasion a great call on institutions for the treatment of cancer in its early stages, when it is most amenable to treatment by radium. Here is a remarkable opportunity for wealthy men to do something to help sufferers from cancer and some other malignent diseases that may be cured by the use of radium.

CANADIAN CHEMICAL PRODUCTION WELL MAINTAINED

The gross value of chemicals and allied products manufactured in Canada in 1920 was approximately $122,000,000 according to a report published last week from the Dominion Bureau of Statistics at Ottawa.

The report states that the actual capital invested in the 456 plants operating in this group of industries in 1920 was $120,000,000. Pigments, paints and varnishes made in 48 plants were valued at $27,000,000 and with this output was first in the field. The report covers ten principal industries producing respectively, coal tar and its products; acids, alkalies, salts and compressed gases; explosives, ammunition, fireworks and matches; fertilizers; medicinal and pharmaceutical preparations, paints, pigments and varnishes; soap, perfumery, cosmetics and toilet preparations; inks, dyes and colours, wood distillates and extracts; miscellaneous chemical industries.

The imports of chemicals and allied products into Canada have gradually increased from $3,169,000 in 1895 to $24,000,000 in the twelve months ending March, 1922. The exports of Canadian products of the same class has risen from $760,000 in 1892 to $9,000,000 in the twelve months ending March of the present year. During the war the great production of explosives in Canada and the shipment of this commodity to the war zone raised the Canadian exports of chemical products to a ground total of $57,000,000 in the twelve months ending March, 1919. The present export figures show that much of the advantage gained in the war time development has been retained and the fact that the statistics for the calendar year 1921 showed [illegible] plants were in operation as compared with [illegible] of the preceding year is further evidence that the chemical industries of Canada are more than holding their own.

As the principal raw materials for [illegible] are mineral products, the advancement of our chemical industry is of prime importance to the mining industry.

Geology of Mackenzie River Basin

FIVE REPORTS BY MEMBERS OF THE GEOLOGICAL SURVEY, OTTAWA

Summary Report, 1921, *Part B,* which is now available from the Geological Survey, Ottawa, contains five short reports on the Mackenzie River area, and a progress report on a coal area west of Calgary. The Mackenzie River reports are printed together as a matter of convenience.

Hay and Buffalo Rivers, Great Slave Lake, and Adjacent Country

This report by S. E. Cameron, based on field work, done in 1916 and 1917, describes the geology of the shores of Great Slave Lake and some of its tributary rivers. The lake, larger in area than Lake Ontario, has numerous deep bays and many islands. Round the northeastern part the rocks are exclusively pre-Cambrian, mainly granite, and granite gnessis, with minor amounts of greenstone, quartzite, conglomerate and limestone, all metamorphosed. Near the contacts with the granite these latter rocks were observed to have stains of copper and iron, but no evidence of deposits larger than stringers.

The Palaeozoic rocks to the southwest hold out more promise of economic value. Ten miles inland from Pine Point on the south shore are the lead-zinc deposits described in the *Canadian Mining Journal* on June 9th., last by Mr. C. B. Dawson, who opened them up in 1920 and 1921 and disclosed at least a million tons of ore.

The numerous superficial occurrences of oil on or near the shores of Great Slave Lake and the encouraging, though unsuccessful results of drilling, together with a favorable conjunction of porous and impervious rock strata, encourage the belief that suitable "structures" and eventually a "pool" will be found within this area.

Gypsum is abundant in several localities, notably on Peace river near its discharge into the Mackenzie, where there is evidence of many millions of tons, obtainable simply by stripping and quarrying.

Beds of salt of good commercial grade have been disclosed at McMurray at a depth of from 600 to 700 feet in a drill-hole put down by the Alberta government during 1920.

A general map of the Mackenzie river area accompanies this report.

Mackenzie River District Between Great Slave Lake And Simpson

In the spring of 1921 three geological parties descended the Mackenzie river together. E. J. Whittaker worked over the ground indicated above, while the others went further down stream. The difficulty of mapping this area is well illustrated on the maps, which shows level, boggy country with only occasional rock outcrops. The rocks are Devonian and Cretaceous in age, little "structure" was observed, and the formations are too low in the geological scale to be favorable to the occurrence of commercial quantities of oil.

Exploration East of Mackenzie River between Simpson and Wrigley

M. Y. Wiliams found here a more varied succession of strata and evidence of geological disturbances. Rocks from late Cambrian to Upper Devanian were determined. The hilly parts of the area have been too much disturbed to allow accumulation of oil, and in the level country, where there might be suitable "structures," there is insufficient outcrop to determine them.

North Nahanni and Root Rivers Area and Cariboo Island Mackenzie River District

G. S. Hume shares a map-sheet with Dr. Williams, his area of exploration lying westward across the Mackenzie. The rocks found are classed as Upper Devonian in age, though part of them may belong to the Middle Devonian. Part of the area has been too much disturbed by folding and faulting to promise oil. The plain, again, may contain "structures" beneath its surface with chances of oil, but the fewness of rock outcrops preclude any conclusion on this point.

A visit was paid to Cariboo Island in Great Slave Lake, where gold had been reported to occur in quartz veins. The rocks are green schist and pink arkose. No gold was found in the pits examined. The owners of the claims, held by the Aurous Gold Mining Company, were encountered later and explained that the gold-bearing veins had not been examined.

Geological Structure of the Mackenzie River Region

This report is a general study of the oil-bearing rocks east of the Rockies from the international boundary northward. With the aid of sketch maps D. B. Dowling outlines the geological history of the area, explaining the earth movements that have caused the area to be alternately sea and land, the deposition of the rocks of successive ages and the subsequent minor movements and denudation that have affected the possible commercial occurrence of oil. This discussion is based on all the known facts and correlates the numerous reports on the areas included. As Dr. Dowling is a master of his subject, this summary should be valuable as a "jumping-off place" for those that wish to study the area.

Kananahis Lakes-Palliser River Map Area

J. R. Marshall reports here his progress in mapping the coal-bearing rocks of this area, 40 miles southwest of Calgary, and the examination of the coal seams exposed. The coal is of the high carbon bituminous variety characteristic of the eastern slope of the Rocky mountains in southern Alberta. There are numerous thick seams already located and partially explored, and it is probable that more and even better coal will be discovered as prospecting proceeds. The only present means of transportation is by wagon. Railway connection to the Calgary-McLeod Line of the Canadian Pacific railway could be provided with little difficulty.

An air compressor (class ER-1) specially suited to small mines is described in Bulletin K-311, just issued by the Canadian Ingersoll-Rand Company. These new machines are produced in their entirety at the Sherbrooke plant and embody all the latest developments in compressor engineering. These include "Ingersoll-Rand" plate inlet and discharge valves; enclosed construction with automatic combined flood and splash lubrication at all speeds; forged steel connecting rod and crankshaft; removable die-cast bearing sheels, etc. The plate valve adopted for these machines is a modified form of the valve used for several years on the largest compressors, which was largely instrumental in making the direct-connected electric motor-driven compressor a commercial success. An outstanding advantage over all types of valve is that it requires no lubrication or mechanical valve gear and is supported throughout its entire operation in perfect alignment without any form of wearing guide. Regulation of the class ER-1 compressor is accomplished either by an automatic inlet unloader or by a "free air unloader" operating directly on the inlet valves. Bulletin K-311 presents an interesting comparison of the various types of compressor and contains other information of value to compressor users.

The Mining Districts

BY THE JOURNAL'S CORRESPONDENTS

NORTHERN ONTARIO

MOND NICKEL OPERATIONS.—For the first time in four years the Mond Nickel Company is now shipping its entire production of matte to the refinery in Wales. Shipments are running at the rate of 5000 to 6000 tons a month. It is expected that by December the refinery will be operating at pre-war capacity, the demand for the metal having become substantially greater.

PANCAKE LAKE.—It is stated that the Crown Reserve is considering an increase in its capital. Recent developments at the Pancake Lake property have been very encouraging and an increase in capital would provide funds to carry on further work. At the 300-foot level the main vein showed a width of 22 feet, of which the first 12 feet assayed $10.00.

CANE SILVER.—Preparations are being made to sink a 100-foot shaft on the Cane property in the Elk Lake district. The property has some promising silver showings, but so far the work done failed to disclose a commercial ore body.

BAILLY ASSIGNS.—The Bailey Silver Mines, Cobalt, has assigned to the Toronto General Trusts Corporation. The company has a bond issue of $150,000 and recently sold its mill to the O'Brien for $75,000, leaving $75,000 of bonds outstanding.

NIPISSING.—During October the Nipissing mined ore of an estimated net value of $151,665 and shipped bullion and residues of an estimated net value of $228,579. The low-grade mill treated 5077 tons and the high-grade plant, 151 tons, while the refinery shipped 201,690 fine ounces of bullion. Shaft number 128 was closed down and the equipment moved to number 26 shaft, which is being reopened. Number 26 vein 5 was worked 11 years ago and produced 1,000,000 ounces of silver. It is expected to produce substantial quantities of mill ore, and in addition this shaft will be used to explore the diabase-Keewatin contact.

COBALT SHIPMENTS.—The only shipper from Cobalt for the week ending Nov. 10th was the Mining Corporation, which sent out five cars of residues containing 192,000 pounds.

KIRKLAND.—It is understood that the Tack Hughes has cut a new vein in a crosscut north from the 700-foot level. The new electrically driven plant of the Harvey Kirkland has arrived and will be installed immediately. Power will be obtained from the Montreal-Ontario transmission line. The Kirkland Board of Trade, despairing of the government doing anything toward the extension of the Kirkland road to the Argonaut mine and the Lightning River district, have decided to raise the money and do the work themselves. The need of a road to Lightning River was urged upon the Government almost a year ago but nothing appears to have been done. The building up of Northern Ontario must for a long time yet depend upon the development of the mining industry and it is the manifest duty of the government to provide suitable means of transportation to new and promising mining camps. Whether or not Kirkland is the logical starting place for a road to Lightning River, that district warrants a road and its building should not be left to private individuals.

DOME.—The Dome has completed the installation of a large crusher on the 12th, or 1450-foot level, which will facilitate work below the 8th level where the other crusher is installed. In opening up stopes below the 8th level difficulty has been experienced in handling large pieces of ore. Development on the 12th and 13th levels is now well under way. Ore bodies showing on the upper levels have recently been cut on the 10th and 11th levels where they show substantial widths of good ore. The Dome continues to maintain an output of about $400,000 a month and is the highest grade mine in Porcupine.

MCINTYRE.—The McIntyre expects its main shaft to reach a depth of 2375 feet by the end of the year. This is the deepest shaft in Northern Ontario.

$8,000,000 DIVIDEND FOR 1922.—Dividends from Northern Ontario mines for the year 1922 will be approximately $8,000,000. Of this amount $1,730,000 will be contributed from Cobalt, $492,500 from Kirkland Lake and $5,585,710 from Porcupine. Up to the end of the present year the gold and silver mines of Northern Ontario will have paid to shareholders a total of over $123,000,000, while if the dividend from the nickel-copper companies be included, the total amounts to $206,000,000. Dividend from Cobalt are $90,000 in excess of 1921 while Kirkland shows an increase of $370,000 and Porcupine $1,360,000.

ROUYN DISCOVERIES.—The recent discoveries in Rouyn township in northeastern Quebec have aroused a good deal of interest and already thousands of acres have been staked and several properties have changed hands. The Quebec Government recently changed several of the provisions of the Mining Act, the one change in particular which is of most interest to Ontario operators and prospectors being the abolition of the clause that permitted claims to be filed on in the land office without being staked on the ground. This change in the Mines Act and the discovery in Rouyn township will greatly stimulate prospecting in Quebec and will no doubt lead to other discoveries.

BOOTS STOCK ISSUE.—It is understood that the provincial Government will endeavour to have the Ontario Companies Act serve as a Blue Sky law in an effort to suppress a good deal of the [illegible] is now going on. An action was recently brought against Jackson Laing and Company for advertising shares of a mining company without having a prospectus [illegible] attempt is to be made to underwrite under the Ontario Companies Act all literature and advertisements used for promoting the sale of shares. If the courts uphold this view, all such literature and advertisements must be signed by all the directors and filed with the Provincial Secretary.

The power situation in Northern Ontario has become more serious again. The rubber on the Hollinger company and the Ontario Government [illegible] that would allow of new developments [illegible] power is regrettable.

BRITISH COLUMBIA

Portland Canal Prospects.—A working bond on the Virginia group of five mineral claims, and also on the Torris group of two claims, has been taken by A. G. Larsen, of Spokane Wn. These properties are situated in the Salmon River section of the Portland Canal District northwest of the town of Stewart, on the Alaska side of the boundary. They lie astride the waggon road in the Salmon River canyon, about 12 miles from tidewater. Considerable work has been done by William Bunting, who put through the deal, showing up three strong leads, two below the road and one above it. A good grade of milling are has been exposed by a short tunnel. The bond covers a period of three years at a price of $75,000, with a 5 per cent, cash payment.

Railway for Portland Canal District.—G. A. Carlson, of the firm of Siems & Carlson, Spokane Wn., visited Stewart recently with Charles F. Caldwell. Mr. Carlson's business was to look into the possibilities in connection with the suggested construction of a railway up the Salmon River valley from tidewater as far as the international boundary. Mr. Caldwell holds a charter for a road over this route. It is stated that, with six promising mining properties rapidly developing on the Alaska side and more than that number in British Columbia territory there is sufficient tonnage in sight to warrant the expenditure that the road's construction would mean. Mr. Caldwell is quoted as saying that the building of the road is almost a certainty.

A Bear River Prospect.—A contract has been let by Fitzgerald Brothers for the driving of 150 feet of tunnel on the Independence Group, Bear River, Portland Canal district. This will give approximatley 125 feet of depth on the ore when completed. A crosscut in the face of the tunnel has proved the lead to be 15 feet wide, containing a good grade of milling ore.

Change in Mining Laws Advocated.—T. W. Bingay, of the Consolidated Mining & Smelting Company, Trail, and R. Randolph Bruce, of the Paradise Mine, Windermere, were in Victoria recently interviewing the Minister of Mines with reference to present methods of assessing mining properties for taxation. It is understood that, on behalf of the mine operators, they advocate some important changes in the provincial law, claiming that greater allowance should be made for mine depreciation.

Farmers Complain.—Mr. Bingay is believed to have made representations, as well, in regard to the petition of farmers living near the Trail smelter for compensation for loss sustained through damage said to have been caused by the fumes from the plant of the Consolidated Mining & Smelting Co. A delegation of farmers waited on the Government recently to discuss this question. A quantity of foliage, blackened and dwarfed, was exhibited as evidence of the devasting influence of the acrid smoke emanating from the smelter. Mr. Bingay denied that the fumes complained of were as bad as represented, asserted that the picture of destroyed crops was overdrawn, and declared that it was possible to pick up blackened and shriveled foliage almost anywhere. He displayed some leaves found on the grounds of the Empress Hotel, Victoria, which locality nobody could say was subjected to the chemical blasts of a smelter or any other industrial plant.

Prospectors Meet.—The Vancouver Island Prospectors' Association wants prospectors included among the classes of workmen entitled to the benefits of the Workmen's Compensation Act. The Provincial Government will be asked to consider making the amendment necessary to broaden the Act in accordance with the Association's wishes. At a recent meeting Thos. Golby gave a talk on the cinnabar deposits of Telingua, Texas, and W. Conway told of the Cedar Creek placer discoveries, Cariboo. He said that a real strike had been made with rich pay dirt. Considerable development had been done on three claims, Platt's, Steven's and Sheridan's. There was an instance of 176 ounces of gold being recovered in one day by two rockers operated by six men.

Kimberley Mines Active.—Accounts have been received of striking mining activity at the Sullivan Mine and at Kimberley in the East Kootenay district. The present output of the Sullivan is 1100 tons a day. The concentrating mill at Kimberley is being constructed as rapidly as the men can put together the material and the machinery. The capacity of this installation will be 1500 tons a day. While there still is little mining in progress at Rossland, at most other centres in the Kootenays there is an improvement. Estimates of the production of silver, lead and zinc for this part of the Province should show a substantial increase over last year, although no figures are available as yet upon which it would be safe to base a definite prophecy. Certainly the tonnage of ore received at the Trail Smelter is much greater and, while at present the silver market appears to be sluggish, the actual production of this and the other metals mentioned has been climbing.

Trail Ore Receipts.—Ore receipts at the Trail Smelter, Consolidated Mining & Smelting Co., for the week ending November 7 totalled 8,044 tons. Of this 7615 tons were from the mines of the Company. The remainder was made up, for the most part, as follows: Alamo, Alamo, 53 tons; Black Rock, Northport, 28; Knob Hill, Republic, 51; Paradise, Lake Windermere, 23; Quilp, Republic, 156; Silversmith, Sandon, 62; Standard, Silverton, 44; Telkwa, Telkwa, 2; and Whitewater, Retallack, 27.

Kootenay Claims Sold.—Purchase of the Wellington group of six crown granted mineral claims, adjoining the Whitewater Mine, was unanimously approved and authorized at a stockholders' meeting of the Slocan Consolidated Silver Mines Ltd. held at the town of Kaslo last week. This action was the culmination of negotiations extending over more than three years.

Address on Prospecting.—"The Mining Industry of British Columbia" was the subject of an address by Dr. S. J. Schofield, delivered recently before the Canadian Institute of Mining & Metallurgy, Vancouver B. C. He divided mining activity into five branches, viz., prospecting, development, production, smelting, refining and marketing.

Prospecting, he said, depended upon topography and the presence of glacial drift. In British Columbia the topography was rugged, the vegetation and timber almost impenetrable, and glacial drift covered the whole mining area. These factors, together with a winter lasting in some sections from six to eight months, made development as well as discovery very slow. He contrasted these conditions with those obtaining across the line, where the climate afforded twelve months of the year for work, and where there was little vegetation to overcome.

In considering the second question, development, the lecturer found that because the ground-water level of British Columbia was practically at the surface, most of the ore bodies were among the primary sulphides, while in the desert countries of the south the extremely low ground water level with its consequent seepage had produced oxides which responded to cheaper treatment

than the British Columbia product. This was the second handicap in an industry where capitalists looked for immediate results.

On the point of production, he was of the opinion that when this was once started on a large low-grade property, the industry had a long life before it and was a steady source of profit to a country where 50 per cent. of the freight carried by the railways came from the mining industry.

He deplored the loss accruing to the industry from the lack of smelting and manufacturing facilities. Trail and Anyox handled a tremendous output, but they were not enough. Raw products were shipped across the line for manufacture, and were shipped back with a duty on them. Manufacture represented the large end of the metal industry, and it was all being done outside the country.

Because most of the ore is of a low grade, mining here must be pursued very economically, and with all the aid that scientific enquiry into deposits and methods of working could give. No money must be wasted on the "hit or miss" methods of mining that had obtained in the past, if it was to compete successfully with the mining industry as carried on in the Western States.

In conclusion, he appealed to the youth of the province to take up the outdoor work in the hills for the development of mining on scientific principal rather than to devote all their energies to sedentary professions, where by they might be surrounded by the conveniences of city life.

Oriental Miners.—A return submitted by Hon. Wm. Sloan, Minister of Mines, to the British Columbia Legislature recently, showed that certificates of competency as coal miners are held by 428 Orientals, 253 of these being Chinese and 175 Japanese. They are entitled to work underground in the coal mines of the Province. The majority of the certificates were issued between the years 1902 and 1915, only nine having been granted Japanese from the year 1917 to date.

"Bump" at Coal Creek.—A severe "bump" occurred in No. 1 East Main, Coal Creek, Crow's Nest Pass Coal Company, on November 13th last. Although haulage and travelling ways of the main counter tunnel were shattered, no one was seriously hurt and only one man was injured. All men in the mine were withdrawn immediately and that section of the workings has been closed down temporarily. The movement appears to have been generally felt in the town of Fernie, a few miles distant.

Tour of Investigation.—Dr. Charles Camsell, Deputy Minister of Mines, Ottawa, and Mr. B. F. Haanel, also of the Federal Department of Mines, have been making a tour of Canada investigating the coal situation. The coal problem of Canada, it is thought, is mainly confined to the Province of Ontario. The Maritime Provinces and Quebec will be supplied by the Nova Scotia Mines, there being direct water communication from the mines to Montreal, and the westerly limits of the Province. Alberta mines are adequate to meet the demands of the Canadian prairies, while Vancouver Island mines can be depended upon to supply British Columbia. It may be added that the mines of the Nicola-Princeton Field and of the Crow's Nest Pass also afford a plentiful source of fuel for their section of the Canadian West.

Coal Output for October.—The coal production of British Columbia for the month of October was some 13,000 tons below that of the previous month. The mines of the Crow's Nest Pass, including the Corbin Coal & Coke Co., fell off in their output about 10,000 tons, no doubt because of the increase in the United States tariff, which practically closes the market south of the line. In the Nicola-Princeton Field most of the collieries show a slight decline. On Vancouver Island the Canadian Western Fuel Corporation is up approximately 3,000 tons, while the Comox Mines of the Canadian Collieries (D.) Ltd. are below and the southern collieries of the same Company a few tons in excess of the September production. The Granby Company's collieries at Cassidy have increased their output by about 4,000 tons. These fluctuations are due, no doubt, to the gathering strength of the domestic demand as winter advances and the weakness of the bunkering trade.

NOVA SCOTIA

Appointment Delayed.—No appointment has been made to fill the position of General Manager of the British Empire Steel Corporation at Sydney and, according to the statement of Vice-President D. H. McDougall, none is likely to be made just now. For a long time it has been openly advocated in the Nova Scotia press that the President of the Steel Corporation should reside in Sydney and that the interests of the Corporation would be advanced if this were done.

Mr. McDougall for Sydney.—Vice-President, D. H. McDougall, it is understood, is about to make his home in Sydney for some time. This will meet the wishes of the public who, knowing Mr. McDougall, are pleased that he is coming back. He is quite capable of representing the President in his absence. His knowledge of steel and coal affairs makes him invaluable and gives business and industry a feeling of confidence while he is near. Labor, too, has lately come to change its views of Mr. McDougall; indeed to those who observe closely it is believed that Nova Scotia miners never wholly lost confidence in him, although at times he was soundly berated. Like the business men and steel workers of Sydney, the miners became a little "peeved" over the prolonged absence of the man who thoroughly understood their difficulties, and who cared to listen patiently to their grievances. Mr. McDougall has given out the statement that the ranking officials will carry on both in Sydney and at Glace Bay.

Larger Stock Piles.—The large trestles of the coal floors at No. 2 Colliery, Glace Bay, have been extended to admit of a stock pile of 500,000 tons of coal this winter. If the weather is favorable for shipping, it will not be necessary to bank this amount, but the Company has sold a large quantity of coal and anticipate a good trade in the Montreal territory in the coming year, and are busy making preparations to meet it. Much of the coal shipped this winter may reach its destination by way of Portland. This may bring about busy times at the port of Louisburg, which for a number of years has been very dull. Probably no other industrial centre in northern climes can boast an open harbour all the year round when, at the other terminus of a railway sixty-nine miles long, the harbour is frozen up for three months each year. Sydney Harbour has a [illegible] and Louisburg a southern, entrance and that makes the difference.

Local Labor Conference.—On a recent occasion, several ministers of Sydney Presbytery met in one of the Glace Bay churches with representatives of the Labor Party and discussed [illegible] in a friendly way presented their complaints. A representation of J. B. McLachlan [illegible]

viz. "The early Christians were imprisoned and stoned to death, and present-day labor leaders receive the same treatment". He neglected to state that few of them meekly submit and none of them show those virtues in adversity for which the early Christians were noted. After last winter's exhibition by J. B. McLachlan, who shouted ferociously for all Canada to hear, who could think of him being "meek and lowly of heart"?

No Union for Steel Workers.—Determined attempts made to organize all the steel workers of Sydney into one union have failed. Superintendent Bischoff carried out the scheme of meeting representatives of workmen from the different departments. This method of settling labor complaints has been most successful in other steel plants. It excels the union method in that all departments may have representatives when grievances are to be discussed. It has all the freedom necessary to good relations and has for its objects the moral and material welfare of the worker and the progress of the industry. Sydney Steel Plant needs all the help it can get through co-operation between the workmen and their superintendents. Nothing short of this will enable it to recover lost ground.

Fighting Fire at Inverness.—The rescue corps of Pictou County and several men from Cape Breton with their breathing apparatus and other fire-fighting equipment, spent the week helping the miners of Inverness to fight a fire in the lower workings. This is the third outbreak of fire in that section of the mine. Progress had been made, but up to the time of writing the fire was not walled off.

The coal output of the United States continues to rise, slowly and steadily. Last week the production of bituminous coal was over 11 million tons, and of anthracite, over 2 million tons.

The many friends of Mr. W. W. Sayers, of the Canadian Link-Belt Company will be glad to learn of his promotion to the position of Chief Engineer of the Company's Philadelphia Works and Eastern operations.

Rich ore has been located at the head of Canyon Creek, Lardeau district B. C. Returns of two thousand ounces of silver to the ton have been secured. Five tons have been taken out and shipped to the smelter at Trail.

"SAFETY FIRST"

See your way clearly—
Ask if you don't understand—
Fix a dangerous spot—
Enlighten the new workman—
Think before you act—
You can do it—

First say to yourself—
"I am going to play safe"—
Remember to **THINK**—
Safety all the time—
That's the way it's done.

Beneath an "iron cap" long known at Skorovas, in the interior of Norway, 90 km. from the port of Namsos, there has been proved lately by diamond-drilling a compact deposit of iron pyrites of unusual purity to the extent of from two to three million tons, with much more in prospect beyond the range of the drilling. A railway to the vicinity of this deposit is in process of construction.

INDEX TO MINE AND MILL SUPPLIES

Addresses of advertisers, whose names appear in the following classified index, may be found upon reference to their advertisements. An alphabetical index to advertiserswill be found on the page facing the inside back cover. The following regulations apply to all advertisers;—One-eigthpage, every issue, three headings; one-quarter page, every issue, six headings; one half page, every issue, twelve headings; full page, every issue, twenty-four headings.

Buyers who are unable to find in the classification heregiven such machinery or supplies as they desire are invited to write Service Dept., Canadian Mining Journal, Gardenvale,Que., who can in all probability, refer them to proper sources

Acetylene Gas:
Pres-O-Lite Co. of Canada, Ltd
Acetylene Welding:

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The Dorr Co.
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Air Compressors:
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Canadian Ingersoll-Rand Co., Ltd.
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Air Receivers:
Canadian Ingersoll-Rand Co., Ltd.
Alloy & Carbon Tool Steel:
Peacock Bros., Ltd.
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Mine & Smelter Supply Co.

Asbestos:
Everitt & Co.
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Canadian Link-Belt Co.
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Lymans, Limited.
Mine & Smelter Supply Co.
Babbit Metals:
Canada Metal Co.
Balls:
Herbert, Alfred, Limited
Holman Bros., Ltd.
Hull Iron & Steel Foundries, Ltd.
Peacock Brothers, Limited.
The William Kennedy & Sons, Ltd.
Ball Mills:
Herbert, Alfred, Limited
Holman Bros., Ltd.
Hull Iron & Steel Foundries, Ltd.
Mine & Smelter Supply.
Ball Mill Feeders:
Herbert, Alfred, Limited
Holman Bros., Ltd.
Hull Iron & Steel Foundries, Ltd.
Mine & Smelter Supply.
Ball Mill Linings:
Canadian Steel Foundries, Ltd.
The William Kennedy & Sons, Ltd.
Peacock Bros., Ltd.
Hull Iron & Steel Foundries, Ltd.
Mine & Smelter Supply.
Balances — Assay & Analytical:
Mine & Smelter Supply.
The William Kennedy & Sons, Ltd.
Belting — Leather, Rubber & Cotton:
Canadian Link-Belt Co., Ltd.
Jones & Glassco (Regd.).
Belting:
Gutta Percha & Rubber, Ltd.

Belting — Silent Chain:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Ltd.,
Jones & Glassco (Regd.).
Belting (Conveyor):
Gutta Percha & Rubber, Ltd.
Dunlop Tire & Rubber Co., Ltd.
Bins & Hoppers:
Can. Chicago Bridge & Iron Co., Ltd
Horton Steel Works, Ltd.

Bluestone:
The Consol'd Mining & Smelting Co
Boilers:
The William Kennedy & Sons, Ltd
Boxes, Cable Junction :
Standard Underground Cable Co. of Canada, Ltd
Northern Electric Co., Ltd.
Buggies, Mine Car (Steel):
Hendrick Manufacturing Co
Herbert, Alfred, Limited
Holman Bros., Ltd.
Brazilian Ballas:
Diamond Drill Carbon Co.
Brick:
Wettlaufer Bros.
Bronze, Manganese, Perforated & Plain:
Hendrick Manufacturing Co.

Buckets:
Canadian Ingersoll-Rand Co., Ltd
Canadian Link-Belt Co., Ltd
Hadfields, Limited
Hendrick Manufacturing Co
Herbert, Alfred, Limited
Holman Bros., Ltd.
The William Kennedy & Sons, Ltd
Peacock Bros., Ltd.

EDITORIAL

The chief and greatest value of gold mines—especially in a new and unexplored country requiring people to work and develop its reproductive [agricultural] resources—lies in its power to attract such people rapidly and in such numbers as no other inducement will succeed in accomplishing.—A. R. Selwyn—1897

THE BEST IMMIGRATION AGENT—GOLD

It is by no means a recent discovery that Canada needs a vastly increased population, and that it is settlers on the land that are principally required. There are periodical fluctuations in the interest of the public in this all-important question, and the action (a rather reaction) of our public administrators fluctuates accordingly. At present we are on the top of a wave of interest, and our public officials, after years of inattention, are preparing to conduct an active campaign designed to help in populating the open spaces of our land. The effort put forth by a handful of public-spirited Canadians in high position on behalf of this problem, backed as it has been by the public press, gives promise of bearing fruit in the near future.

The Canadian public is being informed not only of the country's need, but of the various ways and means of meeting this need. On one point, however, public speakers and the public press have, in general, failed to make clear the facts. The importance of an active mining industry in aiding a rapid and permanent settlement is seldom gauged at its true value. Contemporary events, as well as the history of a century back, demonstrate that the establishment of a mining industry, and particularly of a gold mining industry, is one of the surest means of attracting settlers to the vicinity.

The reasons for the potency of a gold camp in inducing settlement are not far to seek. First of all, the very name of gold attracts men irresistibly, and among those that approach the spot where it is found, many are fated to clear and till the arable land round about rather than to work in the mines. Then the operation of a group of productive mines ordinarily induces the building of a railway, the prime essential for settlement in these days. The mines usually provide work for settlers at certain seasons of the year, particularly during the years of their first development, and, if they are long lived, find a recruiting ground for young miners in the farming community. The mining camps provide one of the best possible markets for the products of near-by farms.

This intimate relationship of mining and land settlement presupposes the occurrence, side by side, of workable mineral deposits and arable land. The two are not associated invariably; but in Canada there are few mining districts where at least small numbers of settlers cannot gain a good livelihood. Many of the fertile valleys of British Columbia, now adding largely to the wealth of the province and of the Dominion, would still be uncultivated were it not for the mines on the hillsides above. It is doubtful whether there would be now any settlement whatever in Northern Manitoba were it not for the promise there of mineral production.

It is in Northern Ontario and Quebec that we have the clearest demonstration of the efficacy of mining activity in promoting settlement, as well as the greatest opportunity for its profitable application. For four hundred miles — the width of the province of Saskatchewan — the National Transcontinental Railway runs through the Great Clay Belt. This belt of land is arable throughout the larger part of its extent —an area twice the size of the prairie part of Manitoba. At numerous points throughout gold has been discovered, and at two points on its southern edge, astride the Ontario Government Railway, productive camps have been established — Porcupine and Kirkland. There promises to be another gold camp sixty miles to the east, in Quebec, which will draw the railway northward from Temiskaming to the Transcontinental Railway, thus intersecting Quebec's portion of the Great Clay Belt.

This conjunction of arable land and gold deposits is a fortunate one for Ontario and Quebec, though it is a nuisance to the miner. Throughout almost the whole of the gold bearing area, outcrops of rock are so few that the prospector is hard put to it to make a find. That so much has been found in spots of this description speaks well for what intensive development will disclose. Meantime, the clearing and settling of the clay belt will proceed at a pace commensurate with the growth of the mines. The value of this [illegible] in the long run, far exceed the value of all the mines will produce, but to the mines must [illegible] for a part of this value.

It is incumbent upon those who [illegible] land settlement and immigration [illegible]

more clearly than they do the value of mineral development as a means to their end. The public press should be instructed in the facts of the case, and then it will, with little urging, exert its undoubted and powerful influence in favour of this rapid, sound and sure means of attracting immigrants and placing them where we need them most—on the land.

CANADA INDEPENDENT IN ZINC SUPPLY

In discussing the prospects for a zinc industry in Quebec, two weeks ago, we stated the supply of this metal for eastern Canada is imported, and that it is doubtful if zinc could be obtained economically from British Columbia. This conclusion was based on facts that are now completely superseded and no longer obtain, and our assumption is most decidedly in error. We have learned since then that the zinc produced at Trail not only supplies the small local demand in British Columbia and provides for the export of considerable quantities to the Orient, but also supplies eastern Canada with all it needs, and has commenced to break into the European market. The fact is that, except for odd lots of small dimensions that find their way into the country mainly by accident, the Trail smelter provides Canada with the whole of her requirement in zinc, and a large amount for export as well.

It is a series of metallurgical researches of outstanding importance in the history of zinc smelting and refining that has given to the Consolidated Mining and Smelting Company this outstanding position in the world's zinc market. These researches were conducted and then applied commercially principally during the war period and the years immediately preceding. When the company was released from its obligations to the Imperial Munitions Board soon after the war, it was in a position to seize the markets for zinc that it now holds. It seems probable that, with the completion of the new concentrator at Kimberley, the phenomenal ore-deposits of the Sullivan Mine will provide the basis for further additions to the markets for Canadian zinc.

COOPERATION AND PROGRESS

Slowly and painfully are certain members and adherents of our mining fraternity learning that the spirit of co-operation is one that best serves the needs of every man's pocket, as it does the needs of the mining industry and of the world of affairs at large. We have in mind particularly the "whole-hog" attitude that has prevented the development of so many prospects, retarded the growth of many a nice little mine, and blocked the successful operation of properties with ore-bodies too lean or of insufficient size to be worked alone. Happily, this attitude of mind is changing rapidly, and now it is no longer phenomenal to find a prospector ready to share the chances of success with the man who puts up the money for development, or to find neighbors sharing the benefit of a central shaft or of a common mill.

The progressive and sound viewpoint can best be demonstrated by examples. The original Elbow Lake find in Manitoba was of such phenomenal richness at the outcrop that the terms asked by, and granted to the owners for an option were in keeping with the realization of ore that would set the world agog with interest. Naturally and inevitably, these high-pitched hopes failed to materialize, the investors declined to take up their option and the district got a "black eye," after many a slim bank account had been reduced by the dishonest operations of boomsters who took advantage of the wave of excitement. Now, under a co-operative agreement, the property is being developed, quietly and consistently, with good prospects of success. The pity is that the original terms were not such that the original operators could have carried on with this work, with a great saving in expense and lost motion.

More recent examples are furnished in Northern Ontario. By taking over the Silver Cliff, which adjoins its Colonial property at Cobalt, Continental Mines adds a mill to its equipment and some promising ground that can be explored and developed from the new Colonial shaft. The Silver Cliff mill and mine have long been idle. We may assume safely that the terms of the lease arranged are mutually advantageous. The Continental Mines management have shown the same clear grasp of the benefits of cooperation in their treatment of the ground they now hold in the Kirkland Lake field. The development of this ground would have been long delayed, and indeed might have been postponed indefinitely, had not the chances, good, bad and indifferent, of the whole long line of claims been lumped with the assurance that the average value disclosed on development would prove remunerative.

The latest instance of this progressive spirit is furnished in the south of the Cobalt silver field. The old Beaver mine, which has failed to carry the financial load it was called upon to bear, is to be operated in conjunction with the adjoining Prince and Badger properties, the Beaver mill being available to treat the ore in prospect. The profit-sharing basis upon which the Coniagas proposes to operate these properties shows the spirit of cooperation in the highest degree.

Anent these examples of progress made possible by the give-and-take spirit that is displacing the ancient (but not honourable) attitude of exclusiveness and insularity, it is pertinent to mention the impasse in the power situation at Porcupine. Hollinger officials have announced that the terms of lease offered them for the water-power they proposed to develop on the Abitibi River are such that they cannot accept them in justice to the share-holders, there being no assurance of a continuous supply of water from works on the

river above under the terms proposed. No statement of the other side of the case has been made as yet by the Ontario government. Meantime we deplore the complete lack of managerial ability and of the spirit of cooperation in the man or men, whether representing a private corporation or holding public office, whose decisions are clogging the wheels of progress. The impasse reached in these negotiations between representatives of the Ontario government, the Hollinger Mines and the Abitibi Pulp and Paper Company, will bear hard on the reputation of one or other of them when all the facts are disclosed.

AN HONEST PROSPECTUS

We have received a copy of the prospectus of Stabell Gold Mines, Limited, whose property is in Dubuisson township in the upper Harricanaw district of northwestern Quebec. The property is described as a prospect of unusual promise, and the facts of the case are plainly given, without colour or exaggeration, by mining engineers of the best reputation. The arrangement by which it is proposed to raise the money required for further development of the properties is rational and sound, and we are convinced that investors are assured of a "square deal" and a "run for their money" in this case, provided the direction of field operations is as sound as the method of raising money. It is distinctly encouraging to find this evidence of a growing appreciation of sound financial methods in preliminary mining development.

Since writing the above, we have read with interest and with pleasure the "Montreal Gazette's" comment under the caption "Stabell Gold Prospectus Refreshingly Free from 'Come on' Features." If more of our responsible daily newspapers made it a habit to discriminate between genuine and illicit mining stock flotations, and then to uphold publicly the true and expose the false (or ignore these latter, which would be almost as effective), they would be performing a notable service not only to Canada's mining industry, but to their own readers.

EDITORIAL NOTES

Professor Mickle's letter, which we publish today, indicates one of the undoubted pitfalls into which Mr Campbell fell in his recent comprehensive study of Canadian mining statistics. We wish, however, to revert to the fact that Mr. Campbell's research on this subject is an unusually valuable addition to the information available, and we hope that it will stimulate further constructive study of the fundamental conditions of mining in this country.

Reports from the Annual Western Meeting of the Canadian Institute of Mining and Metallurgy in Vancouver on November 15th and 16th, and the subsequent excursions, go to show that it was unusually successful. The attendance was large and there was animated discussion of a number of important questions, as well as the presentation of numerous technical papers of prime interest. Our British Columbia correspondent has sent a full account of the sessions, which appears elsewhere in this issue.

On November 19th, there died in Boston, at the age of eighty years, a man known by name to every Canadian engineer, Christian Louis Berger, founder of the well-known firm of instrument makers. He was a man who put into the products, first of his hand and then of his factory, the character that was his own. He was born in Stuttgart, Germany, determined early in life to be a maker of fine instruments, and came to America after having served a thorough apprenticeship in his native city and elsewhere on the Continent and in England. On this continent he reaped the full reward of thorough workmanship and sound business management — qualities that are certainly more nearly universal in Europe than in America. The "instruments of precision" that are now so widely associated on this continent with the name of Berger may well give to many an engineer who uses them the secret of professional success.

DRURY RURAL

(A handbook distributed by the Ontario Government contains about 20 times as many pages devoted to farming as to mining. Hence this verse.)

I always did admire the farm,
The barns and byres and cattle;
For me the country has a charm—
(You know this kind of prattle.)

I know the farmer's merits and
The hard road he must travel;
Full often he inherits land
That's mostly rock or gravel.

But, granting all of this is so,
Suppose his virtues trebled,
He's not the only stone, you know,
With which the beach is pebbled.

So, Mister Drury, listen while
I make a little statement
Without a hint of hidden guile,
Or truth's minute abatement.

We love the farmers and their work,
We love them as our brothers;
But, Mister Drury, though it irk—
Pray don't forget us others!

C. M.

Norman Oil Fields*

MACKENZIE RIVER AREA

by GEO. S. HUME

As was anticipated owing to the difficulties of operations in a distant field, development in the Norman area will be comparitively slow. Last summer the Imperial Oil Company undertook the drilling of three wells previously started and deepened the original well. Great disappointment had been expressed by some interested in the oil fields that the original well, which promised so much in the beginning, had gradually declined until its production had almost ceased. It was not realized by the public in general that when the gusher "came in" the bottom of the well was still in soft shale formation. Cavings into the hole were inevitable and a gradual blocking of the flow resulted until the well stopped production. With these facts in view the Imperial Oil Company last summer deepened the well with most gratifying results. A flow of oil was obtained which amounted to 60 to 70 barrels** per day. The well is now capped aand the oil is being used as fuel in other drilling operations.

Drilling Program for the Winter

Difficulties in drilling caused the temporary abandonment of all three of the other wells, but two drilling crews are spending the winter in the Norman area and the results from these wells ought to be available next summer. Two of these wells, one on Bear Island in the Mackenzie River, known as the Bear Island well, and the other on the west side of the Mackenzie, the "C" camp well, are so situated with reference to the original well that a great deal of information about structure will be available from the records in addition to what can be obtained from surface exposures of rock. The rocks are dipping in a general westerly direction from the Norman or Discovery Range to the east of the well, so that both the Bear Island and "C" camp wells are further down the dip than the original well the "C" camp well being more so than that at Bear Island. This means that these wells will have to be drilled deeper than the original well in order to reach the same productive horizon, the increase in depth being dependent on the amount and direction of dip and the distance between the wells. From surface exposure the dip can be measured and as the distanec is known the depth to which each well will have to be drilled to reach the productive horizon of the original well can be caculated. This has led to the conclusion that in neither the Bear Island nor the "C" camp well has the horizon yet been reached that is producing in the original well, in spite of the fact that the original well is less than 1000 feet deep and that of "C" camp more than 1700 feet.

Important Bed of Sandstone Discovered

There is another factor of importance bearing on the oil situation in this district. As has been intimated, the wells are being drilled in a shale known as the Fort Creek formation. Hitherto it was not known that this shale contained any sandstone members of any thickness. In the course of the summer's work for the Geological Survey a sandstone member of 50 to 75 feet was found in the shale formation and several hundred feet above the "Beavertail" limestone on which the shale rests. This sandstone outcrops on several of the streams between the Mackenzie and the Norman range of mountains, eight miles northeast of the discovery well. A calculation based on the available information seems to show that the depth of the discovery well is now such that this sandstone member has been reached. If such turns out to be the case the flow of oil from this sandstone will be much steadier and give a longer life to the well than could be hoped for from a shale. The shape of this sandstone member is as yet undetermined. It may be that it is in the form of a lense, in which case it might not extend over a wide area, or it may be more in the form of a continuous sheet, in which case it certainly will be encountered in the other wells. As is commonly known, oil tends to accumulate in the more porous beds; hence the sandstone will be a favorable receptacle which will greatly add to the possibilities of production.

Cretaceous Rocks May Hold Oil

The oil in the Norman fields has all come so far from rocks of Devonian age and all the wells have been started in Devonian formations. On the west side of the Mackenzie in the oil district there is a great thickness of Cretaceous deposits overlying the Devonian. Before the period of Cretaceous deposition, the Devonian was a land surface subject to erosion, so that it was unequally worn away. On its submergence again, the Cretaceous sediments were deposited on this eroded surface with the result that the Cretaceous overlies different formations of the Devonian at different places. The contact between the Devonian and the Cretaceous is thus very irregular, or is what is known as an erosional unconformity. Subsequent to the Cretaceous deposition, mountain-building movements took place and the rocks were thrown into the folds with which the accumulation of oil is associated. The period of this mountain-building may have a district bearing on the oil problem of some areas because it means that the Cretaceous as well as the Devonian strata are folded. The Cretaceous formations consist of sandstones at the base overlain by a considerable thickness of shale, which would form a very suitable cover for the retention of oil. It is not impossible, therefore, that oil pools may be present in the Cretaceous as well as in the Devonian.

Bosworth Formation Favourable to Oil Accumulation

Overlying the Fort Creek shales which now form the productive oil strata a series of greenish sandstones and shales known as the Bosworth formation. The sandstone members of this formation produced small flows of oil in the discovery well almost from the beginning of drilling. On the east side of the Mackenzie in the vicinity of the wells between the river and the Norman range, these sandstone and shales are the surface rocks so that any oil originally in them has had a favorable opportunity to escape making the numerous

**Amount given by A. M. McQueen, Vice-President, Imperial oil Co., Toronto.

**Ammount given by A. M. McQueen, Vice-President, Imperial Oil Co., Toronto.

Letters From Porcupine--IV

OUTSIDE STUFF

A rebellion is not a revolution until it is successful. Similarly reformation is a schism until it carries the majority with it.

The owners of mining properties in the township of Deloro are no longer apologetic or explanatory.

Amongst a number of claims that I visited in that township, I wish to refer first to the Ankerite, because there I spent much time most profitably and informingly.

Before touching my notes, taken on the Ankerite, I wish to advert to the *Canadian Mining Journal's* editorial notice of the property to the effect that it is as promising a Porcupine property as there is that has not yet produced bullion. In this opinion I concur, also in the statement that it needed no such advertising as it unfortunately received. To that it may be added, in fairness, that the mining engineer, whose name has been and is now identified with the Ankerite, was totally opposed to such advertising methods, and that the advertisements appeared without his official sanction or knowledge.

The purposeful reopening of the Ankerite is the result of perseverance in the face of much discouragement and (as is usual in many such cases) of overt and covert opposition. However, these things have nothing to do with it, or else just now.

Nothing could well be plainer than the geology of the Ankerite as developed by surface stripping, crosstrenching and sampling. It is not my intention to mention average values etc., because this is not the place wherein to advertise any enterprise. But I do intend to mention my belief that the exploratory and prospecting efforts expended on the Ankerite were exceptionally well directed. Every step had a direct bearing on every other step. Moreover, the future development of the Ankerite will be a source of guidance to operators in the surrounding region.

Nowhere that I know of, overground, are the successive phases of Nature's ore making processes so easily traced as on the Ankerite. The direct and the indirect effects of porphyry intrusions are visible. The difference in the character of the vein filling and the mineralization of the schist is apparent. Here, also, the significance of the presence or absence of tourmaline is obvious, or was made obvious by work done.

These and other points will be elaborated in the course of a separate article which will be submitted to the Editor at a later date. My present purpose has been accomplished in drawing attention to the high quality of the mining engineering on the property.

* * *

An employee of a Timmins business firm invited me to inspect his mining claims. He could show me, he said, a body of schist 200 feet wide and of indefinite length, all of which would pan "colours." The property lay about ten miles from the town. I had seen several others presumably of the same kind—staked for schist and for schist alone. So I did not go. It is the most ungrateful task in the wide world to tell an owner that you do not think much of his property. No matter how right you may be, the owner wants admiration or nothing.

It was a relief, therefore, to hear first hand details of mining being done in the Night Hawk Lake area. Here rational development is succeeding rational preliminaries. At Three Nations, also, most encouraging results are being obtained. My reference here is entirely to the mining aspect of the case. The implied reservation should be obvious enough. In any case there is reason to hope, perhaps to expect, that both these outliers of Porcupine will "arrive."

* * *

In the course of a walk over mining claims south of Timmins I came upon a cabin of particularly neat construction. Everything about it was workmanlike. It was "chinked" in a comforting manner. The cooking arrangements were right, the dishes were clean, the floors were tight and well swept, home made brooms were bestowed in a corner, and altogether it gave me a desire to live there for a week or so. I learned that the architects were Finns who, working with the axes and knives that they had to hand, had turned out a job that it was a pleasure to see. It was a sweet contrast to some of the shacks that I have seen in Porcupine and otherwere.

* * *

To get down to the specific after this interminable rambling I take this opportunity of recommending to all corporations and individuals who intend to become interested financially in Porcupine, the policy of keeping a competent observer on the spot. Whatever the right choice of man granted, it is as sure as anything human can be that his time can be well spent, not so much in the formal examination of properties and prospects as in gathering in and sizing up and boiling down information of all kinds. That he will come on really good [illegible] is almost inevitable.

Not all men are fitted for this office, but many are.

Such a channel of first hand facts and impressions can be made of inestimable value. But the chance will not last forever. My belief is that it will last an extremely short time.

* * *

My imprecations on those personal [illegible] meanings into what one writes [illegible]

[illegible] in this area. To the west of the Mackenzie, west to the Careajou Mountain range, these rocks are mostly overlain by the Cretaceous deposits already referred to; hence, if suitable structures can be located in this area the chances of obtaining oil seem very favorable, either from the sandstones below the impervious Cretaceous shales or from the deeper Bosworth sandstone of Devonian age. Such a favorable condition in the sequence of strata is not always present where Cretaceous deposits occur because, as has already been pointed out, due to the erosion prior to the Cretaceous deposition, parts of the Devonian are lacking and Cretaceous beds lie directly on other members of the Devonian, unsuitable for oil accumulation.

A detailed account of the stratigraphy and structure of the Norman Oil Fields will appear later in the Summary Report of the Geological Survey of Canada for 1922.

innocuous Letters have been misconstued by a number of readers, although I have sterlized, Pasteurized, and otherwise rendered them germless. Several signed and one anonymous communications have have been sent me warning me of the error of my ways. Now that would be all very well if I had east discretion to the winds and had written all that was on my mind. But a feller needs a friend when he has conseiously had before his mind's eye the fear of God, Editor, and reader and still is found fault with. It would seem almost better not to write at all: a conrse that one correspondent earnestly pressed upon me. I am giving his recommendation serious consideration.

* * *

I recall a gathering of mining men in the Shnniah Hostel in Pottsville, years and years ago. It was a very miscellaneous gathering indeed. Bill Davidson was there. So also were brokers and others from Toronto, New York, Montreal and other notable cities. Canadian, English, and United States engineers, promotors, prospectors, and "capitalists" were well represented.

It was eventide. Several games of chance were being played, or worked. Some of the conversation was strictly not far parlor consumption. The Hostess had produced her expected series of unexpected sensations. The crowd was resolving itself into groups. Suddenly a prospector, moved by the spirit of prophecy, took the floor—which was really another man's chair. In a brief but impassioned speech, he told us that the day would come when a thousand stamps would thunder in Porcupine—and that we could all go to H-ll if we didn't believe him!

The prophetic prospector is in another world. Neither he nor more than a half-dozen of his fellow prospectors made a stake. But his prophecy came true. Most of ns thought that he was talking the hottest of hot air.

This may not prove anything at all. On the other hand it may.

J. C. MURRAY

TITANIUM PRODUCTS AND THEIR DEVELOPMENT *

About 1830, Archibald MacIntyre, David Henderson and associates purchased a large tract of land in Essex County, New York, in the heart of the Adirondack Mountains. This deposit was brought to their attention by Indians, who had visited a small forge in Keene Valley, where iron ore was being smelted. The red men told of a great body of similar material forming a dam near the head waters of the Hudson River. The white men accompanied them to this spot, and having examined the surrounding country carefully, soon arranged for a purchase totalling several square miles.

Despite the extreme ruggedness of the country and the fact that these ore deposits were 40 miles from Lake Champlain, these hardy pioneers in 1840 erected a small charcoal furnace. This furnace was remodelled in 1848, and in 1852 a much larger furnace (11 feet 6 inches x 48 feet) was built and operated successfully, using titaniferous iron ores carrying as high as 18 to 20 percent titanic oxide. The operation of this furnace was continued until 1856, when, for various reasons, principally lack of transportation, its operation was discontinued.

This old furnace, still standing, in fairly good state of preservation, was recently carefully examined by experts. Their report to the present owners of the property was conclusive that no serious difficulties had been encountered in the smelting of titaniferous ores. The lining shows no sign of scaffolding: the hearth was blown out clear to the bottom, and the slag shows evidence of considerable fluidity.

As years rolled by there grew up a prejudice against the use of titaniferous ores in blast furnace practice, and about 1890 Dr. Auguste J. Rossi, whose name has since become well known because of his work on titanium, was engaged to demonstrate that titaniferous ores could be successfully used in blast furnace practice under more modern conditions. He produced an alloy of iron and titanium, which it was found later was a most efficient deoxidizer and cleanser for the treatment of steel because of the great affinity of titanium for both oxygen and nitrogen, and also because of the property of titanic oxide, formed by the oxidation of titanium, of combining with other slags and oxides and increasing their fusibility, thus effecting their release from the steel by rising to its surface and combining with the slag. The present extensive manufacture and use of ferro-titanium is a result of this pioneer research of Dr. Rossi and indirectly of the early work of MacIntyre, Henderson and their associates.

Some ten or twelve years ago, in the research departments of The Titanium Alloy Manufacturing Company, at Niagara Falls, New York, the extreme opaquing or hiding power of the white pigment, titanic oxide, when mixed with oil was noted. It was found, however, that to manufacture titanic oxide to compete with other opaque white pigments would be practically impossible. Further research demonstrated that a composite pigment consisting of only 25 per cent of titanic oxide thrown down on a base of precipitated barium sulphate, probably because of the wonderful fineness of the particles and maximum distribution of the titanic oxide, actually had approximately 80 percent of the hiding power of a pigment consisting of 100 percent titanic oxide.

This research followed by careful tests to demonstrate the availability of this composite titanium pigment brought out the fact that such a pigment had greater hiding power than any white pigment known, was exceedingly inert to various vehicles (oils, etc.) and other pigments, was non-poisonous, and had many properties which made it unique among pigments. After several years of research development, this pigment is now being manufactured in large quantities in this country and Norway.

Already many other uses for the element Titanium have been suggested and no one can safely predict the limit of this development, which originated 75 or 80 years ago, when a few venturesome men attempted the seemingly impossible task of manufacturing iron in the wilderness.

* Research Narrative 45, Engineering Foundation.

Users of anthracite coal will be glad to know that the production in the week ended November 18th was 2,191,000 tons, a record that has been exceeded only once in the last six years. The production in previous weeks was not far below this mark, and it is expected that the high rate of production will continue throughout the winter.

Annual Western Meeting C. I. M. & M.

REPORT OF IMPORTANT MEETING IN VANCOUVER

The opening day of the annual western meeting of the Canadian Institute of Mining and Metallurgy, which was held at Vancouver B. C. from the 15th to the 17th of November inclusive, was somewhat unusual because of the fact that there were important and interesting discussions on two matters of policy in addition to the customary formalities and reading of technical papers.

When W. R. Wilson, president of the Institute, who also is the president of Crow's Nest Pass Coal Company, called the gathering together he found assembled several hundred representative mining men of Canada. While those associated with British Columbia industry and with that of the neighboring province of Alberta predominated in number, there were delegates from many other parts of the Dominion, as well as distinguished visitors from the United States.

In sending greeting to the meeting, Mr. Sloan, Minister of Mines spoke of mining conditions optimistically. The industry had been passing through dull times. The over-accumulation of metals during the war and the ensuing depression had not been altogether overcome. Prices still were comparatively low but the tide was turning. There was a healthier tone to the market. British Columbia was on the up-grade. A revival in the Kootenays was presaged. The indications were clear. The wonderful development in the Portland Canal District, the increased interest being taken in the placer mining areas of the Province, and the enterprise of several of the larger corporations in making large investments in development and in plant anticipatory of future large scale operations, were matters that spoke for themselves. He declared that, in spite of conditions that had hampered the coal mines for several months, it might be expected that the coal output for the year would be in excess of that of the previous year.

The President's Address

Mr. Wilson's address struck a high note. It was a pleasure to see so many present and among them members from distant parts. That was the proper spirit. Selfishness was at the root of all evil. No member would get more out of the Institute that he put in. The reason for its being was the facilitation of the interchange of ideas, that those having common interests should help one another. He trusted that that principle would be generally accepted and applied.

E. W. Guernsey, chairman of the British Columbia Division of the Institute, followed with an endorsement of the sentiments of the president in which he, too, extended a general welcome to those present.

Discussion on "Institute Policy"

A summary of a paper prepared by G. C. Mackenzie, secretary of the Institute, on "Institute Policy" was submitted by Prof. R. C. Wallace, of the University of Manitoba, and gave rise to much discussion. He advocated the adoption of the "open door" in connection with membership. All interested in the mining industry should be permitted to join. The scope of the Institute's activities should be broadened. Principles of democracy should prevail. Hard and fast rules in respect of technical or other qualifications, with the exception of an honest desire to be associated with the Institute coupled with respectability, should be removed. Thus the strength of the organization would grow, its influence become greater and its future assured.

The sweeping radicalism of Mr. Mackenzie was combatted by H. G. Nichols, who presented a paper entitled "The Institute Idea," and by J. D. Mackenzie, of the Canadian Geological Survey, Vancouver. Mr. Nichols argued that an organization of technically competent men whether their knowledge came from college training or from practical experience, was of great value to the industry. Collectively they spoke with force and authority. Mere numbers was not a source of strength to such an organization as the Institute. If the policy suggested were adopted the result would be the loss of character and he, for one, would look forward to the opportunity, which he was sure would come, of becoming a member of an organization that would be a more fitting medium for the interpretation of the sentiments of those whose attainments qualified them to speak for the technical and scientific branch of the industry.

Amendment of By Laws Proposed

J. D. Mackenzie's views were much the same as those of Mr. Nichols and he put them in the concrete form of an amendment which, no doubt, will be presented to the members as a whole at a later date. He would have the membership divided into three classes, viz., full members associates, and students. The first would have to measure up to a specified technical standard, the second would be open practically to all interested in mining sufficiently to wish to become identified with the Institute and the third, of course, identifies itself.

Opinion seems to be fairly evenly divided as between the two proposals. Some asked where the discussion was leading, whether there was any prospect of a decision being reached by the meeting. To this it was explained that the issue would have to be put to the entire membership and be decided by ballot.

It developed that, after all, the question is largely one of finance. The Institute finds itself embarrassed. There is an immediate need of action, either in the direction of increased membership or of an addition to the dues. The cost of the issuance of the issuance of the monthly Bulletin, it was shown by a member of the Council, runs into $6,000 per annum and in this connection there was a suggestion that to make the *Canadian Mining Journal* the official organ of the Institute was one path out of the difficulty.

Mr. Rickard on Technical Journalism

After luncheon under the auspices of the Mining Bureau of the Vancouver Board of Trade, an address was delivered by T. A. Rickard, consulting editor of *Engineering and Mining Journal Press*, on "The Duties and Privileges of Technical Journalism." As usual, Mr. Rickard clothed his subject with phraseology of such felicity and anecdotes of such pointed interest that he held his audience attentive throughout. He dealt with the responsibilities of the editors of the technical journals both to their advertisers and to their readers. In [illegible] the former these publications must be [illegible] to be read they must be instructive, abreast of developments in point of news, absolutely reliable and [illegible] independent in their comment. To be of [illegible] those who used them as a medium of presenting [illegible] to possible purchasers they must be all that was [illegible] defined. To be read they must measure up to these standards, and

in addition, be fearless in destructive criticism when warranted and frank in constructive criticism when merited. Mr. Rickard was strong in his denunciation of the competition met with by the legitimate technical press from so-called official organs of the Institutes of the United States. He observed that much the same situation was met with in Canada in the relationship of the Institute and the *Canadian Mining Journal*. If the Institutes destroyed the technical press they would destroy one of their best friends.

Mine Taxation

"Government Taxation and the Mining Industry" was presented by Valentine Quinn, of the Granby Consolidated Mining and Smelting Co. Ltd., who had reference, for the most part, to the situation in British Columbia. He first discussed the failure of the government to permit the deduction of interest on money borrowed outside the Province in arriving at a basis for taxation. In this connection he declared that this Province was far from being a money centre. With one possible exception it was both geographically and financially as remotely situated as any part of the Dominion. "Unjust as this ruling is, however," he continued, "it is mandatory, and an important element in the chaos of tax inconsistency responsible for this great Province shuffling along anaemically instead of striding ahead like a giant in its strength."

He added: "What is needed is a change of viewpoint on the part of governmental authorities, a positive phychology, friendly co-operation; a little more of the spirit of giving, and less of the spirit of taking; a determination to use, as the basis of assessment, the real profits of industry as the constant factor and to allow the rate of assessment to be variant, in accord with the actual minimum requirements necessitated for the maintenance of responsible government."

Mr. Quinn asked that the Income Tax Act be re-written in regard to the allowances made for depreciation, including short-date amortization of war expenditures and obsolescent allowances, depletion, development, and interest on money borrowed outside British Columbia. Fault also was found with the principle of permitting allowances at the discretion of the Minister of Finance. Public accountants could be charged with the responsibility of certifying under oath to the reasonable and fair claims made for deductions, and by means of proper legislation responsibility could be placed upon them for justifying such claims when challenged by the Surveyor of Taxes.

References to the Provincial Government, however, were not all of a critical nature. They were paid a tribute for their proposals for the international coordination of safety-first measures and for the appointment of District Mining Engineers, "whose activities search out the most remotely situated prospectors and operators. To these isolated pioneers is furnished, free of charge, technical advice of the most valuable kind."

Depletion of Ore Reserves

Hugh R. Van Wagenen, of the Canada Copper Company continued the discussion, presenting a synopsis of a paper by R. V. Norris on "Depletion." Mr. Norris set down two fundamental principles for valuation, first that the total value of a property at any date is the value of the future earnings of such property discounted to the date in question, and second that the value of the mineral in the ground, at any date, is the total value of the property (as worked out under the first mentioned principle) less the value of the present and prospective capital expenditures for plant development and equipment necessary to recover such mineral discounted to the same, above stated, date."

Mr. Van Wagenen considered Mr. Norris' methods which he elaborated at some length, as both logical and practical. The Canadian Government already recognized the advantage of basing depletion on net earnings instead of on mine valuation and had adopted that procedure. But the provincial government's method of fixing the percentage for deduction was empirical rather than scientific. In Canada the gold and silver mines were allowed to deduct 50 p. c. of their net earnings for depletion and compute the tax as 10 p. c. of the balance of the net earnings. Copper, lead, and zinc mines were allowed to deduct but 25 p. c. of the net earnings as an allowance for depletion. For coal mines the allowance was about 10 cents a ton. Obviously there was nothing scientific about this. In it there was expressed the opinion that, as between a gold mine and a lead mine, there was less assurance of life in the former than in the atter; the more risk attends the investment of capital in the precious metal than in the base metal mines. "In general" he added "this many be true, but in specific cases it might easily be the reverse of the fact. Norris' method reduces the question at issue practically to the tonnage available, because the other factors are the actual performance of the year just ended and are not assumptions of tonnage handled or profits made. The question of available tonnage is something upon which reasonably close accord can be reached between mine owner and government tax official. An error in the estimate, either under or over, could be corrected at the time when the extraction reached figures which exceeded the estimate or when they fell short of it."

Mr. Van Wagenen did not think it was necessary that the Province should have its own valuators and its own investigations. The Dominion findings should be accepted and the Provincial tax levied as an increment to "that which we pay to the Dominion." This would eliminate the considerable present departmental machinery and expense. He commended the 2 per cent. Mineral Tax. This was a provincial tax based on the theory that the exploitation of natural resources depletes those resources and that the Province should receive a certain amount of money on these wasting assets as they are removed. This was right and such collection should be made regardless as to whether the metal or the coal miner, or the lumberman made a profit. This tax was today a substitute, in part or in whole, for the Provincial Income Tax. Under his plan the tax woud remain as it is in this respect.

Taxes and International Trade

One of the most important of Mr. Van Wagenen's points was made in conclusion and was expressed as follows:

"Fundamentally it is right that the mines be valuated for taxation by the Dominion tax authorities because mines are, in a sense, national rather than local, because they must compete with mines of other nations in markets common to all nations and at points perhaps thousands of miles away from the borders of the Province. It is a matter of the city's own business what tax they put, say on a street car system, because if they advance it to a point where the tram company, in order to make ends meet, must advance the fare from 5 to 6 cents, it is only the people who use that car system who are affected or who care. The tram company keeps on operating just the same and the bondholders continue to receive the interest on their investment. But if a provincial government taxes a copper mine to the point where that tax represents another cent or two added to the cost of production, the additional burden might prevent successful

competition with the large producers of the United States, of South America, or of Africa."

Discussions with Provincial Authorities

In the informal debate that ensued it developed that a committee of mining men had waited upon the Provincial Government with reference to allowances for depreciation and depletion and had received a very attentive and sympathetic hearing. This was testified to by H. Mortimer Lamb, the secretary of the meeting; R. Randolph Bruce, of the Paradise Mine, Windermere; and T. W. Bingay, of the Consolidated Mining and Smelting Co. Mr. Bruce said of the matter of allowance for interest on money borrowed outside the Province, that it must be remembered that this was not a child of the present but of the previous government. The only difference was that then the rate was not great enough to trouble those affected. Taxation increases had made it a point of importance. It also was to be borne in mind that this principle was applied not alone to the mining but to all other industries in the Province. It could not be said that the mining industry was being discriminated against or that it was being particularly unfairly treated. Depreciation and depletion allowances had been made since January 1, 1921. Failure to make the Act retroactive, in respect of this amendment, no doubt did leave some companies, as stated, with considerable arrears of taxation. There was some present dissatisfaction with the method, or lack of method used in arriving at a just basis for these allowances. However, he was convinced that the government was alive to the necessity for action. Mr. Bingay's remarks were along much the same line. He did not take much stock in some of the more or less involved proposals of working out a system. The truth of the matter, he bluntly stated, was that, now that the government was moving in the right direction, it was difficult, owing to the variety of ore bodies being operated, their variety in character, etc., to offer advice, that in its general application, would be satisfactory.

This closed consideration of the subject, it being left with the understanding that negotiations and investigation would be continued with the authorities.

The Visiting Members

In addition to those whose names have been mentioned as having taken part in the discussions of the first day there were many visitors in attendance. Dr. C. Camsell, Deputy Minister of Mines, Ottawa, was given a warm welcome by his numerous British Columbia friends. He extended greeting from the Minister, the Hon. Mr. Stewart, and expressed his pleasure at returning to the Pacific Coast for a short visit. J. McLeish, Director of the Mines Branch, Ottawa; C. M. Odell, of Glace Bay, N. S.; Prof. Wallace of the University of Manitoba; J. A. Campbell, commissioner of Northern Manitoba; B. F. Haanel, chief of the Fuel Testing Department, Ottawa; Prof. J. A. Allan of the Department of Mines, Edmonton, Alberta, and included in visitors from the other side of the line, Messrs. L. K. Armstrong, J. G. Bradley, S. J. Butters and C. W. Merrell were some of the distinguished delegates. It may be said, by the way, that word was brought by those from Spokane, Wn., of the revival of activity in the Coeur d'Alenes. The growing market for lead and zinc and the better prices were having an almost magical effect in that district. All the big producers were operating again on a large scale and many properties that had been closed down were resuming work. Last fall difficulty had been experienced because of labor shortage. That condition had improved and general conditions were most encouraging.

Mr. Armstrong, of Spokane, was called upon at the opening of the Thursday morning session. He spoke of the pleasure it gave him to be present, of the work of Columbia District Institute, of which he is a member, and advised members to be up on their toes and taking a leading, rather than a following part, in the industrial and other problems of their countries in these days of unrest.

"Blue Sky" Laws

"Blue Sky Legislation in Manitoba" was the subject introduced by Prof. R. C. Wallace, of the University of Manitoba. He sketched the conditions in this regard in the prairie provinces of Canada. A form of "Blue Sky Law" had existed in Manitoba since 1911 while the Provinces of Alberta and Saskatchewan had followed suit in the years of 1916 and 1920 respectively. The object aimed at was not the hampering of industry but the prevention of the stacking of cards against the public by the dealer. Manitoba was not as yet a great mining district but it was a favorite ground for the flotation of companies. Forty six of the States of the Union had adopted legislation of the "Blue Sky" variety. Such legislation could be divided into two classes, that represented by the Fraud Acts and that which endeavored to prevent fraud by regulation before it developed. The latter was the form of law in effect in Manitoba. To obtain a charter a Company was required to appear before a Board or a Commission, to give particulars as to the property to be developed, what was paid for it, the personnel of the Board of Directors, what capital and what treasury stock existed, and so forth. If those in authority found the enterprise a reasonable and legitimate one the charter was issued and permission was given to proceed, but the stock was placed in the hands of a trustee and no promotion stock was allowed. Briefly that was the system followed and, while there were arguments against any interference with the investment of money in mining ventures, there was no doubt that it had saved Manitoba from the boom of 1914.

his Province there was a Public Utilities Board, which had to be satisfied as to the bona fides of all propositions involving stock flotation. An effort had been made to have the Board appoint a qualified engineer to report on such properties as were to be exploited. The approval of such a person, he thought, would be the public's best protection.

An Example of "Salting"

E. E. Fowler, who was Chairman of the session, was doubtful regarding the efficacy of any 'Blue Sky' regulations. Recently an incident had come to his notice that happened in the Kootenays. A man of wealth, but of no mining knowledge, had lost some thousands of dollars.

Mr. Shanks, of the Province of Alberta, said that he He had bought what he took to be a valuable gold quartz property. On it there were two adits, an upper and a lower, with a raise on one. A bucket of gold bearing ore had been raised to the upper level, shown to the intending buyer and, its richness being clear to anyone, had been taken away ostensibly to be thrown on the dump. Actually it had gone down to the lower adit and been brought to the surface again by the route of the upper adit. The operation had been repeated a sufficient number of times to serve the purpose of the owners. He asked whether it was possible to protect the public against this kind of utter foolishness.

Prof. Allan, of Alberta, emphasized the need of uniformity among the Provinces in "Blue Sky" law if it was to be effective. This point had been referred to by Prof. Wallace and he thought it well taken. The Manitoba law lost its value to a large extent when properties adja-

ted in the province could be fraudulently boomed in other parts of Canada. The same applied to Alberta and other povinces where such legislation had been enacted. There was need for a common Canadian law.

Mr. Rickard observed that while you couldn't protect the fool you could make it hard for the knave. He was of the opinion that no competent engineer would find any of the "Blue Sky" laws extant irksome. He though the Institute should support such legislation because every dollar that went into fraudulent proposals meant so much less for legitimate investment. He was inclined to think, however, that much more money had been lost through the over-capitalization of big companies than in "wild cats." He had in mind two companies on the Rand, South Africa, that had made a loss in four of five years for stockholders of $204,000,000 because of the gradual recession of the valuation placed on the properties.

The Metallurgy of Zinc

"The Story of Zinc" as given by Prof. H. N. Thomson, of the University of British Columbia, was a special treat both as to its informative and its intertaining features. He mentioned that since his last talk on complex ores there had been notable progress made in the metallurgical treatment of zinc ores. It was common knowledge that the Consolidated Mining and Smelting Company at Trail now accepted concentrates carrying 30 per cent. of zinc ore or more. As an illustration of some of the reduction difficulties he pointed out that the Company undertook to account for 85 per cent. of the valuable content when the material ran 50 per cent. or better, and to be responsible for somewhat less when it ran below that percentage in metal content. The speaker went right back to the methods of the ancients in traeing the evolution of zinc extraction practices. Coming down to modern times he dwelt on the comparatively recent realization of many of the new commercial uses to which the metal can be put. Figures were given showing the insignificant output of seventy-five or eighty years ago as against the production of around 1,000,000 tons per year at present. The development of smelting efficiency was indicated by the statement that the first plants required 20 tons of coal to produce one ton of zinc while those of today take only four tons of coal to make one ton of the metal. He sketched the steps that led to electrolytic process becoming an economic factor in the industry. In this connection the enterprise of the Consolidated Mining and Smelting Co. during the years 1913, 1914 and 1915 was referred to—activity that had continued with the result that new methods had been evolved that were of first importance to the operators of the Kootenay Districts of this Province.

Ore Testing Plant

The paper of Prof. S. J. Schofield, University of B. C., on "The Mineral Industry of B. C.," which has been previously summarized, created considerable discussion. This arose through the speaker's endorsement of the proposal for the establishment in the Province of an Ore Testing Plant. J. D. Mackenzie did not think that this was a matter of special importance. What did matter was the finding of the ore deposits, and metallurgists then could be depended upon to work out economic methods of treatment. As illustrating his point he instanced the Big Sullivan Mine, Consolidated Company, now the greatest producer in the West. Prof. Schofield thought that Mr. Mackenzie's illustration supported his argument. He had inspected the Sullivan years ago. One Company had "gone broke" over it. If there had been an Ore Testing Plant in the Province it was possible that the problem of the treatment of these ores would have been solved ten years earlier.

The Premier Mine

The Premier Mine, Stewart, B. C., was described by Dr. George Hanson, of the Geological Survey. He outlined the geological history of the mineral zone in which this great producer is situated. The circumstances leading up to the acquisition of a controlling interest by the American Smelting and Refining Company were detailed. Some account was given of the development underground and in the plant that has since taken place, several miles of tunnelling, a greater amount of diamond-drilling and much improved facilities for the mining, treatment and shipment of the ore.

Cariboo Lode Deposits

Prof. W. L. Uglow, University of B. C., was followed with close attention in his account of the quartz veins of Barkerville, Cariboo District. Reference was made to the recent exploration work of Mining Corporation of Canada on Proserpine Mountain. This had ceased and consequently the lode gold mining possibilities of the section had received somewhat of a "black eye." The professor questioned the justification of the conclusion that seemed to be generally taken. There were, he declared, two distinct series of quartz veins traversing the ridge of mountains of which Proserpine was one. One kind was large and apparently almost barren and the other smaller and, it would appear, of some considerable promise. The one intersected the other and he had no hesitation in saying, that, at the intersection, further exploration was fully waranted. He had taken some samples of these stringers and while unable to give assay returns, not yet having received them from the Ottawa laboratories, he was sufficient sure of his judgment to feel safe in making this statement. He maintained that all the indications were that the placer gold of the headwaters of Williams, Grouse, and other creeks of the section, which had produced great wealth in the past, was of local origin. It came, in his opinion, from the ridge of mountains referred to and it was only fair that something along this line should be said in view of the impression created by the cessation of the operations of the Mining Corporation. Certainly the veins described merited close investigation.

Moving pictures of the gold and silver mining industries of Ontario and of the asbestos industry of Quebec concluded the day's programme.

Papers on Coal Mining

Friday and Saturday were given over to coal mining and its problems. There were a number of papers in the morning, including "The Complete Gasification of Coal and its Bearing on the National Fuel Problem" by John Keller, of Vancouver; "The Development of the Coal Industry of Canada" by F. W. Gray, Montreal; "Progressive Coal Mining" by Geroge A. McHattie; "The Coal Mining Industry of Alberta" by T. A. Richards, District Inspector of Mines, Edmonton; and "Some Interesting Features of Modern Coal Mines" by R. R. Wilson, Victoria B. C.

In the afternoon there was an excursion to the coal mines of Vancouver Island, of which a fair percentage of the delegates took advantage. On Saturday also there was a visit by some of those interested to the collieries of Nanaimo, Ladysmith and Cassidy, Vancouver Island.

The meeting was pronounced generally one of the most successful in the history of the Institute.

The production of silver-bearing ore on Keno Hill Yukon Territory, this winter will exceed first estimates, according to recent arrivals from Mayo. Approximately 7,500 tons will be ready for a spring shipment from Mayo, it is thought. The Treadwell Yukon Company is working 100 men at Keno.

Statistics and the Canadian Mining Industry*

A REPLY TO MR. C. M. CAMPBELL'S LETTER.

BY PROF. G. R. MICKLE

To the Editor, Canadian Mining Journal.

I have read Mr. Campbell's letter in the *Canadian Mining Journal* of November 3rd., under this heading. I have no sympathy for statements that are not based on accurate observation and inference whether optimistic or pessimistic. If we are to act wisely we must first accurately observe and then draw the proper logical deduction. This is where it appears to me Mr. Campbell fails. The fallacy in his line of reasoning, I think, is shown in the following passage:

"I have been accused of being a pessimist; of holding a 'lugubrious brief'; of 'attempting to belittle the mining industry' and of being lacking when it came to a question of intelligence. These remarks have been made in different journals and represent the penalty one pays for taking the negative side in a popular belief. My chief crime seems to be that I have insisted that engineering rules which apply to individual mines should also apply when statements of 'fact' in regard to our national reserves are being made and when the life of these reserves is being estimated. No reputable Company, it is generally admitted, in developing its property will estimate its life mainly on probable reserves; it will not ignore loss in recovery and it will not, if it be a coal company, seriously consider seams 1 ft. thick at a depth of 1,000 feet. National reserves, I am convinced, should be treated in the same way." —(pp. 745-6 Can. Min. Jour. Nov. 3rd.)

I maintain that it is entirely illogical to compare and treat in the same way two things which are essentially different, such as the individual mine and the national resources in mining. These two things differ in this important essential affecting the point at issue; the individual mine has a restricted area, usually one, two or three claims—a matter of a hundred acres or so—whereas the national area is relatively almost infinite. The individual mine must find anything that is to benefit it on that restricted area or fail. The national resources have no such limitation. Furthermore it is a fact that by a collection of risks, risk can be eliminated. This elimination of risk can be complete or particular; for example, suppose an article worth one hundred dollars is sold at a raffle 100 tickets being sold at one dollar each, then each person buying a ticket is gambling, which is defined as the "act of exchanging something small and certain for something large and uncertain." Now suppose one person buys all the tickets, then he has paid one hundred dollars, collected all the risks, and receives the article worth one hundred dollars. This transaction would not be gambling.

An Insurance Company, if it insured one man for $1,000,000, would indeed be gambling, and no Insurance Company would take such a risk without allotting part of it to other companies; but no Insurance Company would hesitate about taking risks on 1000 men for $1000 each. Life Insurance is perhaps the safest business known although it is based on taking risks on the most uncertain thing.

Now the individual mine is in a very similar position to a Life Insurance Company which has insured one man for a large amount and has taken no other risks, success or failure is all dependent on one thing, which is uncertain. Nationally there is no such condition, the failure of the individual mine is not ruinous to the nation. But with regard to mineral resources we are nationally somewhat in the position of the Life Insurance Company which has taken a large number of risks on the proper actuarial basis.

Let us consider Mr. Campbell's statement quoted above in another way and put it to the test. If it is correct and logical as a mode of thought now it was always correct. Supposing it had been necessary ten years ago or so to form an idea of the resources of the Cobalt district in silver. According to Mr. Campbell's argument one should simply take the estimates of ore reserves given by all the operating mines and add them together. And yet anyone following the course of development at that time and during the years preceding would know that in any given year the leading companies would issue a report showing that so many ounces, say 2 or 3 million, had been mined during the year, and so many ounces, possibly 5 or 6 million were estimated to be in reserve. The following year would show possibly more ounces in reserve than were estimated for the previous year, notwithstanding the fact that several million ounces had been taken out in the meantime thus showing that the estimated reserves were not in any way a true measure of the silver that existed on the property in question. Should that experience, occurring persistently, be ignored? Furthermore in such a calculation allowance should be made for the production of veins then undiscovered, but which proper observation and deduction would show would certainly be found. It is plain that an estimate made on Mr Campbell's principles above-mentioned would have been obviously ridiculous. Or again, about the same time that is ten years ago, would anyone who was required to make a survey of the mineral resources of Ontario have neglected to assign an important role to the gold mines? No gold mine was making a profit at that time and the ore reserves in the ordinary sense of the term were insignificant or non-existent, and yet it was obvious that gold mining was of importance for the future.

The Province of Ontario levies a tax on the profits of all mines. Does anyone maintain that this is now a provincial resource of substantial value and that a prudent company with ample means and well advised on the engineering standpoint would not pay a considerable amount for an assignment of the taxes if the province was willing and able to transfer the right to levy these taxes? If we followed Mr. Campbell's line of reasoning we could only assign a tax for one or two years. Provided the tax is unmitigated, it is almost as certain as anything can be that ten or twenty years from now revenue under this tax will be paying from properties that are now unknown. At the present time the major part of the revenue under this tax is from mines which were undiscovered [illegible] when the Act came into force fifteen years ago.

The illustrations used above are all taken from one gas. It is of course obvious that if the [illegible] valued holds true for the [illegible] coal field, much more must it [illegible] national field.

G. R. Mickle.

Toronto, Ontario.

*This letter is published concurrently in the Canadian Mining Journal and the Bulletin of the Canadian Institute of Mining and Metallurgy.

News and Comments

BY ALEXANDER GRAY

Babson A "Bull" On Canada

Not a word has got into the Canadian press about the remarks of Mr. Roger W. Babson, the Economist, at Cooper Institute, New York City. To an audience estimated at 10,000 (half as many more unable to gain access to the historic hall) Mr. Babson touched the metaphorical electric button when he declared that of all the places he knows of, from his study and personal information, Canada is the most attractive field for investment. Now, while Mr. Babson does not lay claim to being supernatural, or infallible in judgement, he is recognized as a super-economist, a student who correctly gauges the trend of affairs. Without being invidious or wishing to prejudice any field where capital can be safely employed, he gave precedence to the one country with a present under beneficent government, a statement, however, that did not imply misgivings as to the future of United States. The circumstances under which the utterance was staged and the applause it evoked, leaves no room for doubting the responsiveness of the audience, or the motives of the speaker. And what is more, he urged the location in Canada of branch manufacturing establishments. "Do it now," he declared in effect. "You may not profit for a while; but you should be prepared for what is certain to happen in Canada."

How the Figures Sermonize

The considerately compassionate Editor of *Canadian Mining Journal* has sought to "point a moral" that will be taken to heart by the well-meaning and the merely over-anxious who exceed the elastic limits of imagery in exaggerating surface showings. He delicately drew the hair-line between "half-truths," "white lies," if you will, and the downright prevarication which displays a patch as a blanket.

A prospect need not be compared with great producers. It need not be all its promoters would wish it, and yet contribute to the gold output. So the Editor advised the speedsters to get their machine "on low." Assuming some of the lapses from the verities to be "within the law" but infractions of the truth, he chided and benignly admonished them to "go and sin no more."

What was written in the last issue about "overstatements," consequently, was admirably catholic in spirit. Rather than classify as habituals those who subscribed to obviously misleading literature, the Editor indulged in dignified rebuke, leaving the anologous Ananiases who wheedle widows and orphans out of their slender hoardings, to be dealt with as the Law provides. He has no toleration to spare for those who contend that a "greater than Hollinger," "more propitious than Dome Mines," "more impressive than McIntyre," merely awaits a little canary seed to make it warble wealth.

As for the more incorrigible to whom the Editor addressed himself, it is unfortunate that those Analogists are confronted by Dome doings, how long it took to do them, and what it cost. McIntyre is a striking example of how a property could rise beyond its original sponsors, to become one of the three Porcupine pilots. How far removed are the tarradiddlers from a clear conception of the Hollinger past and present, is illustrated by the latest operating results, to November 11th.

To that date, in forty-five weeks, the Hollinger had milled 1,282,192 tons with a gross value of $10,977,982, making the weekly average spread over the period, $243,955. The weekly operating profit was $107.797, the total as given being $4,850,804.64. From the dividend standpoint, the profit was 75 per cent. in excess of requirements. The liquid surplus was over $7,000,000.

As the operating cost per ton milled was $4.4604, and the average value $8.56 per ton milled, the per ton profit was $4.10. This profit factor would have been higher were it not for the development policy in anticipation of the increased milling capacity. Notwithstanding this, the difference in cost favoraby compares with $5.2641 reported for the same period in 1921.

It is possible a shortage of power, and other causes, may increase costs and slightly curtail production during the final period. If these drawbacks do not seriously interfere, the mill will crush 1,500,000 tons in the year, for about $12,840,000, of which about $12,400,000 will be recovered.

Of the $10,977,982 representing the gross value of what was milled, $10,587,000, or thereabout, was recovered in the forty-five weeks. Of that, 45.8 per cent. was profit

All things considered, therefore, the company's operating profit this year may be around $5,750,000.

Such totals sustain the remonstrances of the Editor of the *Canadian Mining Journal*, rather than have the frequently ridiculous confounded with the sublime, when Dome Mines presage a production of about $4,500,000 and McIntyre may be relied upon to bring the combined production of Porcupine's trio nearly to $20,000,000.

Flaunting frills before there are more than furbelows cannot attract all the capital the North Country deserves, however bewitching the get-up.

TECK-HUGHES REPORT A MODEL ONE

The eighth annual report of the Teck Hughes Gold Mines of Kirkland Lake is excellent in its treatment of the affairs of the company and in the clarity and conciseness with which the General Superindendent D. L. H Forbes reviewed the operating mining and development position. Mr. Fobes did a very neat piece of work, stated the position so the shareholders can see for themselves. Without laboring obvious features he goes beyond his present estimated ore reserve—79,974 tons, gross value $1,183,176, averaging $14.79 per ton—and concludes:

> "On the whole, the year's operations were highly satisfactory and the finding of important ore-bodies in the No. 1 Vein at the 7th level is encouraging in relation to the future of the mine at greater depth."

Having put that of record, Mr. Forbes means it. He leaves the mine to harmonize his horoscope and current valuation of $1,183,176 with the company's capitalization of $3,870,000, plus $339,100; but the lower levels are so promising, the directorate is fortunate in having a General Superintendent to whom the property can be entrusted. To have done so well in a reconstruction period, when the mine demanded development under difficulties; in view of the fact that the crushing was not reached until May last, the financial year ending August 31st, the results are decidedly flattering to all concerned. In this connection the Directors have this to say

Sixth and Seventh Level Developments

"About the first of the year a better average grade of ore was obtained from the developments being made on the sixth level and January was unexpectedly good, and February fair. In March, April and May the tonnage treated was nearly to capacity of the mill but the grade of ore was not nearly as good as was expected owing principally to slonghing in a stope which caused a heavy dilution in the average grade going to the mill. In July the developments permitted ore from the sixth level to be again delivered to the mill and the grade treated that month averaged $23.14. In August the average heads were $23.55 and while it is not included in our fiscal year, it will be interesting to note that ore from the seventh level and from the new vein found to the north of the No. 3 vein at this level, added to ore from the levels above, brought the average grade treated up to $43.79 per ton. The Manager found that the high grade of ore being treated made it economically necessary to reduce the number of tons treated daily, and he has found that the treatment of about 100 tons per day is the best policy for this grade ore, and therefore, during September the average tonnage treated, owing to the high grade, was reduced to 88 tons per day, although the values of the ore treated that month was as high as $148,000."

On the altered running basis the September grade must have averaged very much higher than that of the ore reserves. Evidently Mr. Forbes hit the high spot and availed of it, which is permissible, considering the financial requirements. Of the new vein found on the seventh level to the north of the No. 3 Vein from which the bulk of the ore milled came, the Directors state that at the time of their writing it had been "drifted on for 440 feet. Two thirds of this length was in good ore and practically two thirds of the ore body encountered is high grade." No. 3 Vein also had been drifted on for "about 500 feet and two thirds of this length is in good ore and twothirds of this ore-body is high grade ore."

For the first time, therefore, the company has a real current asset position—a liquidity of $254,993.99 as against current liabilities of approximately $34,100. There is an Impairment Debit of $366,251.35, after including the profit for the year amounting to $111,822.59.

Operating Details

It is in the hand presentation of operating details that Mr. Forbes specially excelled, both in brevity and information. The 43,300 tons milled yielded $11.11 per ton. "Inning to $481,144.02, the average being $11.11 per ton. "Including exchange premiums and interest, the gross revenue for the year was $550,407.61, or 11.58 per ton. The total *direct* operating cost was $300,914.53, or $7.09 per ton; while *indirect* charges, such as depreciation, new construction, financial charges, extraordinary expenses, etc., amounted to $82,672.51, or $1.91 per ton, making the total of direct and indirect charges come to $389,595.04 or $9, and leaving a net revenue of $111,822.59, or $2.58 per ton."

Candor and conservation of credits in this manner cultivate confidence, even though it may not enthuse speculators. Teck Hughes has had a thorny pathway. That the mine has retrieved itself as now shown, should have a bearing upon Kirkland Lake's producing section. Mr. Forbes is able to abandon his wonted reserve in his forward view, and development and drilling to further depths are in order. He supplements what the Directors said by giving this on the year's developments:

"On the 6th level, in addition to the expected ore shoots that were found in the No. 3 Vein, important ore-bodies were discovered in two branch veins that strike northeasterly from No. 3 Vein; while, on the 7th level, running parallel to and north of the No. 3 Vein, the No. 4 vein was found to have high grade ore shoots of considerable length."

That may or may not explain the delphic utterance of the Directors, that "the Company has purchased and prospected for some additional mining properties." It would have been more in line with the rest of this explicit annual report, if the purchases had been defined. Of the tonnage milled, 13 per cent. came from development. There is a broken ore reserve of 19,213 tons.

On the whole, the Teck Hughes and its Management are headed for the clearing. But conceding this does not suggest that the company is yet capable of continuous distribution of profits.

There is this to be further said of the Teck Hughes under the mangement of Mr. Forbes: The annual report is decidedly in the past tense. When the outputting returns for 1922 are tabulated, it will probably be found that Teck-Hughes is the second largest producer in the Kirkland Lake field, despite early milling grade and the fire and power failure from October 4 to November 4—a whole month without milling. Teck Hughes performances are distinctive in their sphere, and it is the second deepest mine in the camp.

The following prospectus has appeared in the first (and last) issue of the "Unauthorized Bulletin of the C. I. M. & M.", published on the occasion of the recent Western Annual Meeting in Vancouver. This Bulletin is replete with information, mainly personal, and with suggestions for the progress of the Mining Industry, and is particularly strong on verse—again, mainly personal. We regret we are promised "no more" issues of this delightful publication.

PROSPECTUS

COAST STEEL RANGE COMPANY

Officers:

Tickle Compson, Esq.	President
Kemal Pasha	Secretary

OBJECTS

The object of this Company is to [illegible] tonishing deposit of nickel-trimmet [illegible] discovered during the past summer by Dr. C. V. Vrooms, the celebrated iron expert of the Geological Survey of Kuplooops, B.C. In this vein, shoots containing [illegible] ception, are exposed [illegible] the creek greatly the density of [illegible] thermore vast opportunities for [illegible] tension of negotiations [illegible] Turkish Government, [illegible] the [illegible] to hold.

[illegible] to the following conditions:

[illegible]

[illegible]

[illegible]

Iron Ore Smelting By Electricity

Alfred Stansfield, Birks professor of metallurgy at McGill University, Montreal, outlined some of the difficulties in the electric smelting of Canadian iron ores, in an address given Oct. 9, 1922, before the Cleveland Section of the Association of Iron and Steel Electrical Engineers. After tracing the history of the experiments at Sault Ste. Marie, Heroult (Calif.), and those in Sweden financed by the Jernkontoret, it became evident that the design of a successful furnace was no simple matter.

The "elektrometall" furnace, developed by the Swedes, was with some small exceptions the only one in successful commercial operation, but iron ores can be smelted successfully in the "Noble" furnace developed at Heroult and even in a plain, open-top, pit furnace, and these latter furnaces are preferable to the Swedish furnace for the production of gray foundry iron.

Gray Iron for Foundries

Whereas the Swedish furnace operates much like an ordinary iron blast furnace, in that ore reduction and even carbonization of the spongy iron is done by hot CO gas rushing up the stack, low furnaces, of course, must rely almost entirely upon direct contact with solid carbon for reduction and carburization. Doubt has been expressed that the latter will produce the gray iron required for ordinary foundry work in view of two facts: (1) The normal output of the Swedish "electro-metal" furnace is white iron, despite its approach to conventional blast-furnace principles; (2) that it was found exceedingly difficult to make "synthetic iron" containing more than 2½ per cent carbon, when remelting steel scrap with granular carbon in an electric furnace. Professor Stansfield was quite positive that these two facts had been stressed unduly. The Swedes make low-carbon white iron because that metal is more desirable for conversion into steel and wrought iron, and this is the use to which their production is put. Furthermore, synthetic pig iron carburizes so very slowly because the reaction takes place only at the surface of the bath, covered with floating carbon. Keller, in France, showed how to get high carbon by charging the carbon and steel scrap in layers. Therefore a pit furnace would produce high-carbon iron if there remained a slight excess of carbon in the ore column when it finally reached the bottom. This residue of coke or charcoal would rest on the hearth, supporting the granular charge above, and submerged in the molten metal, dissolving therein. Then if conditions were correct—the furnace operating with a "free-burning" arc at high voltage—silicon would also be reduced and the furnace would produce the soft graphite iron required for ordinary machinable castings.

Excess of Carbon in Charge is Fatal

An electric furnace is quite sensitive to correct proportioning of the charge. An excess of carbon arriving at the hearth will remain there, and even accumulate if some lean charges are not forthcoming, gradually plugging up the furnace and stopping the operations. It cannot be burned out with more air at the tuyeres, for there are no tuyeres. It simply remains until some solid oxide reacts with it or the metal dissolves it away. On the other hand, a cumulative slight deficiency in carbon (in an electric furnace) means poor reduction, large slag loss and a hard semi-steel, low in carbon and silicon. Even the best of electric smelting furnaces are subject to these troubles—a low pit furnace has something the better of the Swedish shaft furnace, in that a much shorter time is required for a corrective charge to work its way to the seat of the trouble.

Experience with several furnace designs indicates that iron is smelted best when the arc is free burning —i.e., immersed in the charge but slightly—and surrounded by an incandescent crater of flame and gas. Deep immersion diffuses the heat because many more paths through the ore charge are offered by which the current can leak from electrode to electrode. Short circuits are then frequent and the voltage must be reduced; partial fusion and reduction occurs at many points, and the charge has a tendency to "hang up." Even worse conditions result if the electrodes are forced still lower into the molten slag or metal, when the furnace becomes completely short circuited.

Economic Considerations

Professor Stansfield pointed out that inherently electric smelting demanded cheap power. Two-thirds of a ton of fuel per ton of pig iron may be saved, but in general the electric energy required (1 3 hp.-yr.) costs more than that much coke, although it may cost less than the amount of charcoal that would be saved. It follows that the electric furnace is unlikely to replace the coke blast furnace, though it has successfully replaced the charcoal blast furnace in Sweden. It was his opinion, also, that electrical energy was far too valuable a commodity to be used permanently in such a crude operation as ore smelting. It could be done only on the "outposts of civilization," where the power might easily be developed long before the demands of culture and industry could absorb it. As population increased, their multifarious needs would warrant them paying a far higher price for electricity, and ore smelting would be discontinued. This is not a particularly bright outlook for the method, however. The speaker said the reason, in his opinion, why electric pig iron was not now being produced in Canada was on account of their high labor and material costs and a lack of a special market which could be filled by that special quality of iron. But is it not true that labor and materials are always high in the outposts of civilization and there is never a local market for special irons and steels?

Professor Stansfield considered that there was a field for the application of electric smelting of iron ores on a limited scale at points where conditions were especially favorable, but that any large-scale development of electric smelting must form part of a process in which the ore would be reduced to the metallic state in fuel-fired furnaces at a low temperature before entering the electric melting furnace for the production of steel.—From Chemical and Metallurgical Engineering.

A booklet full of information for users of insulated conductors has just been issued by the Standard Underground Cable Company of Canada, and is available on request. Of particular interest to miners is the description of Standard Rubber Insulated Wire conductors, both twin and concentric, for mining machines.

CANADIAN ENGINEERING STANDARDS ASSOCIATION

The semi-annual meeting of the Main Committee of this Association was held November 13th, in Ottawa, at the Offices of the Association, Mr. H. H. Vaughan in the Chair.

After the transaction of formal business, the Secretary reported that the membership of the Association as of October 1st was 285, all members taking part in the work of various active committees of the Association.

Progress reports of the various working committees were presented, and it was announced that the Specifications for Steel Highway Bridges, Incandescent Lamps, Watthour Meters, Wood Poles for Transmission Lines, Flexible Wire Rope and Strand for Aircraft, and Commercial Bar Steel are well advanced or are ready for publication, that for Steel Highway Bridges being in the press. The Specification for Flexible Wire Rope and Strand for Aircraft was approved for publication.

In conformity with a request from the Secretary of State's Department, a formal resolution was passed changing the location of the Head Office of the Association from Montreal to Ottawa.

The Secretary's Report on the activities of the Association during the past six months was received and approved.

The personnel of a Sectional Committee on Road Materials and Construction under the Chairmanship of Mr. A. W. Campbell, Dominion Commissioner of Highways, was approved, this committee including representatives of all the Provincial highway authorities and, having as its principal object the obtaining of Dominion wide agreement on nomenclature, definitions and tests for road materials; and co-operating with the Committee recently appointed by the Engineering Institute of Canada on Road Construction.

A request having been received from the American Engineering Standards Committee for Co-operation in unifying divergent local requirements for the traffic Signals on Highways, it was decided to request the highway departments of the nine provincial governments, the Board of Railway Commissioners, the Canadian Automobile Association and other bodies interested in automobile traffic, the larger cities of the Dominion, the Engineering Institute of Canada, and the railway associations to nominate members on this Committee. The functions of this Committee will be to make a survey of present conditions in Canada, prepare recommendations accordingly and consider these in connection with the draft suggestions to be prepared in the United States and forwarded by the American Engineering Standards Committee.

It was decided to take similar action in connection with a request for the Association's co-operation in connection with Specifications for Electric Overhead Crossings, the organizations interested in this case being the Board of Railway Commissioners, the steam and electric railway authorities, the power companies, and various power commissions, the provincial governments, and the various telegraph and telephone companies.

A suggestion from the Sub-Committee on Concrete and Reinforced Concrete that action should be taken looking to the preparation of specifications for Reinforced Concrete Poles was approved.

The Secretary reported that a number of favourable and some unfavourable replies had been received to the invitation sent out by the Honourable Mr. Robb, Minister of Trade and Commerce, for an interprovincial conference to be held under the auspices of the Association regarding the possibility of obtaining Dominion-wide agreement as to the requirements for the design, inspection and installation of electric fittings, appliances and equipment, and it was hoped that the conference in question would shortly be held.

It was announced that the grant to the Association from the Dominion Government has been continued for the fiscal year 1922-23, and other contributions to the funds of the Association were reported. The Auditor's Statement and balance sheet as of October 1st was received and approved.

A LITTLE TALK ON THRIFT

By S. W. STRAUS,
President American Society for Thrift

It is well to understand that the mere saving of money is not the sum total of thrift. This is a point that frequently is not given sufficient attention. Too often thrift is considered synonymous with tight-fistedness.

If it were true that thrift consisted merely of a narrow-minded process of hoarding, this country would never have attained its present exalted place because most of our national leaders have been successful primarily through thrift.

Thrift is no more the manifestation of selfishness and small mindedness than is success itself. Thrift does away with waste. It is careful planning and wise spending. It is efficiency and progress. Washington once advised a friend that "it is not the lowest priced goods that are always the cheapest." And in this advice he reflected one of the great truths of thrift. Spend money savingly. Save money sensibly.

We have had too much one-sided teaching on this subject. Too much emphasis has been placed on the word "Save" and not enough on the word "Thrift" in its broad, progressive sense.

Let us understand more fully that it is essential to save with prudence. It is also just as necessary from the standpoint of progress that we learn how to spend wisely, and achieve success through the exercise of good judgment and rightful transactions.

It would not be possible to exaggerate the [illegible] virtue of saving. Since the days of human progress, it has been one of the most necessary of all personal practices. Every encouragement should be given to those who are saving. Encouragement should not stop there. It is sometimes the better part of thrift to spend a dollar now and then if by doing so one is enabled to purchase an article for $10 that [illegible]. The right kind of spending keeps business going, creates demand for labor, builds up our cities and [illegible] incentive and reward for enterprise and prudence.

Unless we understand and practice [illegible] we do not comprehend thrift.

The Orpaulic Lagoon at Leopold [illegible] tent, under which it is hoped to [illegible] pool, has been drained by the Bureau [illegible]. The land is now available for [illegible] of ley has been commenced.

The Mining Districts

BY THE JOURNAL'S CORRESPONDENTS

NORTHERN ONTARIO

Coniagas takes over Beaver.— Several deals for ground in Cobalt and the vicinity have recently been concluded by different Cobalt companies. The deal between the Coniagas and the Beaver has been completed and it is understood that work on the Beaver will be started very shortly. The Beaver had a working agreement on the Badger and Prince properties and development of these properties will also be undertaken by the Coniagas. The Beaver mill will be enlarged to a capacity of 150 tons a day to permit of the treatment of lower grade ores, but the chief work will be the development of the lower contact. The Beaver has a shaft down 1400 feet and at this depth a strong vein carrying some silver pockets was found. On account of an extensive roll which is known to occur in the diabase, it is believed that this vein offers excellent possibilities. The basis on which these properties are being taken over is not known definitely, but it is understood to be on a profit sharing arrangement.

Continental takes over Silver Cliff.— The Continental Mines has taken over the Silver Cliff. It is not believed that any immediate work will be undertaken on the Silver Cliff, but is was considered advisable to take the property over in case the Colonial veins went that far.

Mining Corporation takes over Little Keeley.— The Mining Corporation has aequired the Little Keeley property in South Lorrain and as is also understood to have taken a lease on the Peterson Lake property in Cobalt. September production of the Mining Corporation was 173,290 ounces from 8,051 tons of ore, which should show a snbstantial profit. While September has been the best month, production for the year will run about 1,500,000 ounces.

No Assignment of Bailey.— Bailey officials state that the company has not assigned to the Toronto General Trusts as was reported.

Victory Silver Closed.— Work has been stopped on the property of the Victory Silver Mine.

Colonial.— The Colonial shaft has reached a depth of 450 feet. It is being sunk to a depth of 900 feet.

Keeley Record.— During the month of October the Keeley produced 93,540 ounces, which constitutes a record to date. Production for the first ten months of the year has been 606,000 ounces. The property is in excellent shape and engineers state that they never saw a better showing in any of the Cobalt mines.

Cobalt Shipment.— During the week ending Nov. 17th, the Mining Corporation was the only shipper from Cobalt, with three cars containing 226,000 lbs.

Mill Closed.— The Dominion Reduction has closed down for the winter.

Kirkland.— Aetivity in Kirkland continues and general conditions throughout the district are decidedly encouraging. The Kirkland Gold is now making a profit and is finding good ore on the 1000-foot level. The Sylvanite with a shaft down to 500 feet is making preparations to sink to 800 feet. Developments recently at the Teck-Hughes have been very favorable and mill heads have been running over $40.00 a ton. Two shifts are being worked at the Goodfish and drifting is being done on the 200-foot level. The Continental has found several encouraging showings and is considering the sinking of a shaft.

Walsh Claims Optioned.— A deal has been concluded for the Walsh claims in Catharine township, ten miles north of Englehart, the option being taken for English interests represented by A. D. Miles. Further surface work will be done preparatory to diamond-drilling. These same interests are diamond-drilling the Skead Gold mines and the first hole is understsood to have intercepted a vein carrying encouraging gold values.

Patricia Prospect.— Philadelphia people are investigating the Patricia property with a view to reopening it.

Goldale.— An encouraging find has been made on the 500-foot level of the Goldale where one of the crosscuts cut twelve feet of $8.00 ore. The property is well located and is being energetically developed.

Davidson.— Davidson Consolidated shareholders have been asked to ratify a by-law providing for the distribution of 400,000 preferred and 1,000,000 ordinary shares of the Porcupine Davidson, which are owned by the Davidstn Consolidated. They were also asked to ratify the sale of 268,105 preferred and 638,411 ordinary shares of Porcupine Davidson. The latter company is an English company capitalized at $1,000,000 which bought the Davidson property for a share consideration. Shares were offered in England but the issue was not well received and in order to provide funds for development the English interests are buying back shares from the Davidson Consolidated on the understanding that the money will be loaned for two years in order to build a mill and sink a shaft. The company is also considering the purchase of adjoining properties.

Steam Power Plant.— The Consolidated West Dome Lake will instal a steam plant in order to carry on work during the power shortage.

More Power.— The Great Northern Power Company, which is installing a hydro electric plant on the Montreal River above Elk Lake, is putting out a bond issue of $850,000 to provide funds for extensions to the plant. The Indian Chutes plant can develop 6500 horse-power.

A plant is in course of erection at a peat bog near Eaton Rapids, Michigan, for the production of peat fuel at the rate of 100 tons of prepared fuel per day.

It is stated by engineers conversant with the ore-deposits and coal seams of the Belgian Congo that that part of mid-continental Africa will soon be one of the world's important metallurgical centers.

BRITISH COLUMBIA

A New Machine.—Alexander Halliday, of Prince Rupert, claims to have designed a plant which, within itself, combines the functions of crusher, gravity concentrator, and oil flotation. As it can be built to any scale, and as the smaller types are easily transported, the inventor thinks that he has hit on something that will appeal strongly to the prospector and small operator in this Province.

Gold Mine Reverts to Owners.—The Bullion Mine, famous by reason of its gold production when operated by the late J. B. Hobbson and because of subsequent litigation in connection with the title to the property, once more has been before the Courts. A syndicate represented by Max Macgowan, of Vancouver, took it over some months ago, the intention being to raise sufficient funds to resume operations on a large scale. Mr. Macgowan's plans, however, appear to have failed and an order now has been granted under which the property reverts to the former owners, W. T. Ward and associates.

Trail Ore Shipments.—Shipments to the Trail Smelter, Canadian Consolidated Mining & Smelting Co., during the week November 8 to 14, aggregated 8,576 tons. There were four new shippers, the Gem, 12 tons; the Noonday, 26 tons; the Ore Bin, 2 tons, all of Sandon; while the Silver Dollar, with 28 tons, is situated near Salmo, in the Nelson-Arrow Lakes division. Other shippers were: Alamo, Alamo, 46; Bell, Beaverdell, 37; Knob Hill, Republic, 54; Molly Hughes, N. Denver, 5; Quilp, Republic, 101; Rambler, Cariboo, 106; Silversmith, Sandon, 138; Standard, Silverton, 180; Van Roi, Silverton, 46; Whitewater, Retallack, 27; and company mines, 7765.

Ore Testing Plant.—No decision has yet been reached as to the location of the ore testing plant the Dominion Government proposes establishing in British Columbia. Dr. J. H. King, Minister of Public Works, Ottawa, assures his constituents of the City of Cranbrook, East Kootenay, that he is "hopeful" that $100,000 will be placed in estimates at the next Session as a result of a "full investigation by Mines Department this summer." The Minister adds: "the location of the plant must be left to the judgment of officials, with a view to having a location so the mining industry can be best served."

Gold and Silver in Cassiar.—James Lapscombe, agent for the White Pass & Yukon Railway Company at Atlin, B. C., says that the placer mining production for the Cassiar district for the past season will be about the same as last year, viz., $111,200. Near the town of Atlin a silver lead property is being developed by J. M. Ruffner, the results of which it would be premature to forecast. The ore-bodies are promising and Mr. Ruffner is looking forward with confidence to receiving good reports on a small trial shipment of ore shipped recently.

Optimistic View of Cedar Creek.—E. J. Bourne, a mining engineer well known in the Cobalt district, Ont., has been inspecting the Cedar Creek placer field, Cariboo. He takes a fairly optimistic view of conditions there. Lower operating and material costs of course would be a great help to those interested in its development, he states. He expressed the opinion that the British Columbia legislature should be careful not to over-tax the mining industry. The treatment of mines generously in this respect would be rewarded by increased activity.

Alexander Estate Retains Engineer Mine.—The Engineer Mine, Atlin, B. C., reputed to be the richest lode gold mining property in the Province, belongs to the heirs of Allan I. Smith, of Philadelphia. Judgment has been given by the Privy Council to this effect. The group of claims known as "The Engineer Mine" are situated on the shores of Taku Arm of Lake Tagish and were first staked in 1899. In the followed year it was acquired by the Engineer Mining Company, an American corporation, and during the ensuing five years considerable exploration work was done. The necessary assessment work was not recorded in 1907, nor was the Corporation's Free Miner's Certificate renewed. This resulted in the lapsing of the title and the late Captain James Alexander re-staked in 1907 and spent considerable sums in development and in mine equipment, ultimately obtaining Crown Grants to the property. In 1918 Captain Alexander and his wife were drowned. A will was located in Montreal under which Allan I. Smith was made his heir. The mine was in the hands of the official administrator when matters were further complicated by Mr. Smith's sudden death. The rights of his heirs were attacked by the Engineer Mining Company on the ground that the claims had been "jumped", and for other cause duly set out. It appears, however, that the maze of legal entanglement now has been cleared away, that Mr. Smith's estate is confirmed in its possession, and that something can be done now in the way of operation. This summer, it is authentically reported, representatives of strong mining interests have been thoroughly inspecting and reporting upon "The Engineer." If their reports are favorable early news may be expected of the transfer of the property and of plans to re-open and place it on a shipping basis.

Iron and Steel Industry.—The British Columbia Government states that negotiations for the establishment of an iron and steel industry in the Province have not advanced very far. The Minister of Mines in the House recently declared that no assistance would be given without full information first being laid before the Legislature and that the policy was to encourage such concerns as were ready to furnish strong financial backing and possessed practical experience in iron and steel manufacture acquired either in Europe or America.

NOVA SCOTIA

Submarine Coal Mining.—The paper on submarine coal mining read recently by Mr. F. W. Gray before a meeting of the Engineering Institute of Canada at Sydney was intended to stimulate discussion on this topic, which is of prime importance in Nova Scotian coal fields. It has succeeded in its object. Mr. Gray's conclusion that in the case of the Mabou mine "the flooding was due to poor management" has aroused some discussion. It is hoped yet to recover the mine. The flooding of the Port Hood mine, stated Mr. Gray, has never been satisfactorily explained. The strata along the shores of Glace Bay, New Waterford and Sydney Mines are regular and without fractures and mining men may rest assured of adequate protection from the sea, though at any time unknown geological conditions may be encountered as the mines advance.

Mine Fire at Inverness.—The fire in Inverness Mine is still burning, and has so far defied all attempts to put it out. It is now being walled off. It broke out in a chute at No. 7 landing, and filled the mine with smoke and black damp. Rescue corps from Stellarton and from the Dominion Collieries went to the help of the Inverness men, taking with them their smoke helmets and other fire fighting equipment. It was found

impossible, however, to use these owing to the height of the seam. A crush had taken place in this district, and the seam was only about two feet high, and so much stone had been piled on the sides of the chute that there was just about 2 feet space to work in. It took a considerable time to clear out the black damp and get down to No. 7 chute where the fire had started. It was found impossible, however, to get up close to the fire owing to the crush that had taken place, as stoppings built could not be made tight, and air was carried up with the men. A temporary stopping was built below this chute and an effort made to go on to No. 8 chute, which was further in. This was slow work, but was finally accomplished. Stoppings were built the whole length of this chute, but here again progress was necessarily slow owing to the fact that the crushed walls caused leakage when the stoppings were put up. It is the intention to go in from the upper part of No. 8 chute and wall off the top of No. 7 chute. With permanent concrete stoppings above and below the burning area, the fire may be damped out. Work is being carried on as usual in the other parts of the mine.

On the same day that the Canadian Newspapers informed the public of Lenine's proclaimation favoring a return to capitalism the United Mine Workers of Nova Scotia at a sub-convention decided against uniting with the Third International of Moscow. The action of the convention is merely a coincidence and is not to be taken as a change of front on the part of the Red leaders, whose faces are still set towards their comrades of the Revolution. The truth is, Nova Scotia miners never favored Moscow, although some of them permitted themselves to be used to elect Red officials to position. This object attained, the Moscow program was dropped and a new one, or rather a borrowed one, the six-hour day and five-day week, was taken up. It may be new to Nova Scotia but it has been discarded in Britain, and is likely to be thrown aside, in the United States when the report of the commission that is now investigating mining conditions in that country is handed down. There is no necessity for a six-hour day and a five-day week, in the mines of Nova Scotia. There is no over-production, and there never was any, nor is there likely to be for many years to come.

India is becoming rapidly an important factor in the iron and steel trade of the East. Japanese manufacturers are now feeling the effect of India's competition in Japan.

During September 5203 tons of pig-iron was exported from the United States. Of this over half, or 3768 tons, came to Ontario and Quebec.

The report of "strikes" of copper ore in the Bird Lake area, 70 miles northeast of Winnipeg has started a rush, and a large area has been staked. It is reported that exploration with the diamond drill is to be conducted during the winter.

The Transvaal gold output for October 1922 amounted to 778,159 fine ounces, as compared with 747,089 fine ounces for September 1922, and 707,825 fine ounces for October 1921. The figures for last month show that the Rand has beaten all records since October 1916, and exceeds the corresponding output for the same month in 1921 by 70,000 ounces. This result is to be attributed entirely to improved efficiency in rock-breaking and a better working tone among the natives.

INDEX TO MINE AND MILL SUPPLIES

Addresses of advertisers, whose names appear in the following classified index, may be found upon reference to their advertisements. An alphabetical index to advertisers will be found on the page facing the inside back cover. The following regulations apply to all advertisers;—One-eigthpage, every issue, three headings; one-quarter page, every issue, six headings; one half page, every issue, twelve headings; full page, every issue, twenty-four headings.

Buyers who are unable to find in the classification heregiven such machinery or supplies as they desire are invited to write Service Dept., Canadian Mining Journal, Gardenvale, Que., who can in all probability, refer them to proper sources.

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Ash Conveyors:
Canadian Link-Belt Co.

Ashes Handling Machinery:
Canadian Link-Belt Co., Ltd.
Canadian Mead-Morrison Co.

Assayers and Chemists:
Ledoux & Co.
Thos. Heyes & Son.

Assayers' and Chemists' Supplies:
Lymans, Limited.
Mine & Smelter Supply Co.

Babbit Metals:
Canada Metal Co.

Balls:
Herbert, Alfred, Limited
Holman Bros., Ltd.
Hull Iron & Steel Foundries, Ltd.
Peacock Brothers, Limited.
The William Kennedy & Sons, Ltd.

Ball Mills:
Herbert, Alfred, Limited
Holman Bros., Ltd.
Hull Iron & Steel Foundries, Ltd
Mine & Smelter Supply.

Ball Mill Feeders:
Herbert, Alfred, Limited
Holman Bros., Ltd.
Hull Iron & Steel Foundries, Ltd.
Mine & Smelter Supply.

Ball Mill Linings:
Canadian Steel Foundries, Ltd.
The William Kennedy & Sons, Ltd.
Peacock Bros., Ltd.
Hull Iron & Steel Foundries, Ltd.
Mine & Smelter Supply.

Balances — Assay & Analytical:
Mine & Smelter Supply.
The William Kennedy & Sons, Ltd

Belting — Leather, Rubber & Cotton:
Canadian Link-Belt Co., Ltd.
Jones & Glassco (Regd.).

Belting:
Gutta Percha & Rubber, Ltd.

Belting — Silent Chain:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Ltd.
Jones & Glassco (Regd.).

Belting (Conveyor):
Gutta Percha & Rubber, Ltd
Dunlop Tire & Rubber Co., Ltd.

Bins & Hoppers:
Can. Chicago Bridge & Iron Co., Ltd
Horton Steel Works, Ltd.

Binestone:
The Consol'd Mining & Smelting Co

Boilers:
The William Kennedy & Sons, Ltd.

Boxes, Cable Junction :
Standard Underground Cable Co. of Canada, Ltd.
Northern Electric Co., Ltd.

Buggies, Mine Car (Steel):
Hendrick Manufacturing Co.
Herbert, Alfred, Limited
Holman Bros., Ltd.

Brazilian Ballas:
Diamond Drill Carbon Co.

Brick:
Wettlaufer Bros.

Bronze, Manganese, Perforated & Plain:
Hendrick Manufacturing Co.

Buckets:
Canadian Ingersoll-Rand Co., Ltd
Canadian Link-Belt Co., Ltd.
Hadfields Limited
Hendrick Manufacturing Co
Herbert, Alfred, Limited
Holman Bros., Ltd.
The William Kennedy & Sons, Ltd
Peacock Bros., Ltd.

EDITORIAL

Is quite evident that one of the purposes which the [Canadian Mining] Institute places before itself is the checking of "booming" and artificial inflation in relation to mining speculation, and more particularly the prevention, so far as possible of fraudulent or misleading prospectuses—Lord Aberdeen—1897.

HOW DID THE GOLD DEPOSITS ORIGINATE?

In these modern times there has grown up round every large mining camp a mass of geological lore and theories, which usually is boiled down after a time to a few well-founded ideas that prove extremely useful in the exploitation of the camp's resources. It is expressly a search for these ideas that has occupied Mr. Cyril W. Knight of the Ontario Department of Mines in the Cobalt silver field for the last two years. The result in this case has justified fully his search.

In the case of the Porcupine gold camp, there has not been the amount of public discussion among geologists and miners about the origin of the ore-bodies that usually attends the development of a camp of its dimensions. This may be due to there being so few producing mines, the students of conditions in each of these few having kept his conclusions as private property. This exclusiveness is not in the best interests of the camp as a whole. There should be more public discussion of Porcupine's economic geology. An excellent foundation has been laid for such a discussion in the reports of the Ontario Department of Mines; but Porcupine's miners and geologists have failed to build upon it. In this connection, the present studies of Mr. A. G. Burrows are awaited with the greatest interest. There is a rumour that he is going to throw a large sized bomb into the camp, whose bursting fragments will bowl over many a sedate, and possibly unsuspecting, theorist.

Meantime we are able to present today a timely geological argument and deduction. Mr. Murray's article based on the field work of Mr. Clifford Smith, certainly will not meet with unanimous approval throughout the Porcupine camp, if it did, part of its object would be frustrated. It presents a simple explanation of the occurrence of workable deposits of gold on one property that may be applicable, in whole or in part, to other properties. If the deductions are correct, it will prove a valuable aid in further exploration.

We hope that Mr. Murray's article will initiate a profitable and wide-spread public discussion of the origin of the gold deposits of Porcupine and other northern camps.

PROTECTION AGAINST FRAUD

It is indeed encouraging to find that at last a conference, under official auspices, has been called to consider the question of more efficient protection of the investor in mining shares in the Dominion's principal mining province. On several occasions lately public officials have made a genuine attempt to curb the activities of "wild-cat" gold mine promoters in Toronto and elsewhere throughout the province. Uniformly they have found that the wily gentry of the slippery kind who were responsible for the nefarious trade had already found a loop-hole in the laws through which to retreat to safety. This is, of course, characteristic of the light fingered profession in general.

Already a great deal of money has been thus collected, and consequently lost to the genuine mining industry. Some well-directed publicity during the last few weeks has, no doubt, alleviated the case considerably; but still there are a number of purveyors of worthless mining script at work in Ontario, as elsewhere. There is now a genuine body of public sentiment behind the movement to make this type of thievery illegal. This will give heart to those both private individuals and public officials, who have been trying for years to develop some rational means of protecting those investors who are susceptible to protection.

A number of recent events point to the conclusion that protective legislation of a moderate and rational sort, designed principally to prevent the incorporation of companies intended obviously as a means to barefaced robbery, will not by any means impede the development of mining prospects worth developing; it will, on the contrary, stimulate honest and rational mining development. Lately a number of mining promoters destitute of funds with which to develop [illegible] looking prospects have stated their [illegible] plainly, and have met with a ready response from investors. This is in spite of the fact regarding the speculative mining stock now enjoyed and deserved. If the investing public [illegible] reasonable degree of protection from fraud, there is no doubt there would be a very large amount of capital

capital available for mining development, principally from small investors, — much more than the amount now being dissipated annually by the sale of bogus stock.

The discussion on "Blue Sky" legislation at the meeting of the Canadian Institute of Mining and Metallurgy last month illustrates another point at issue. Last winter, and previously, a flood of useless gold mining script based upon supposed mines in Northern Manitoba was poured into Montreal. The promoters could not satisfy the protective laws of Manitoba, so sought victims in Quebec, where there are no such laws. There were many victims. Not one of these properties is now a productive gold mine, and it is unlikely that any of them will ever return a dollar to the shareholders. An analogous case was the sale in Montreal recently of certain Ontario gold mining stocks that could not be sold legally in Ontario. The *Canadian Mining Journal* investigated one such case of bare-faced fraud and found that the Ontario provincial authorities, though willing and anxious to bring the culprits to justice, were unable to take any action, because, though the fake company was represented as incorporated in the province of Ontario, the fraud was being committed in the province of Quebec. There must be some measure of uniformity and of co-operation among the various provinces if the laws are to be effective.

Most of the provinces have now reasonable and effective "Blue Sky" legislation. If Ontario is added to the number, there is no doubt that soon there will be a Dominion-wide protection against stock-jobbers. If the laws for Ontario are formulated in the moderate and rational spirit that seems to pervade the present conference in Toronto, we are confident that our mining industry will benefit materially.

CANADA'S MINERAL RESOURCES, ONCE MORE

The cautious Westerner has raised a storm of protest among his fellow-engineers in the notoriously conservative East. Today we print still another reply to Mr. Campbell's letter in the *Journal* of November 3rd, in which Dr. Corless vindicates his original statements and points out some discrepancies in Mr. Campbell's deductions.

If this question of the potential capacity and relative importance of Canada's mineral resources concerned a topic of minor importance only, the volume of discussion that has centred round it would have become wearisome long ago. The fact is that it is a question of vital importance to Canada and to all Canadians, and any discussion that can aid in its clearer comprehension and that can point the way to progress is well worth while. The whole of the discussion so far has been profitable.

While we cannot agree with Mr. Campbell in his general conclusions, we appreciate the value of a good deal of the material he has brought forward to support his argument. Particularly do we value the service he has done in opposing, single-handed, the hosts of optimism. Optimists (*we* optimists) need a periodical corrective to our ruling tendency, lest caution be thrown to the winds. Mr. Campbell has earned the thanks of his brother engineers for having set himself to a task that few would be willing to undertake, and that would be shirked by any but a man of his determination and public spirit.

CANADIAN COPPER FOR CANADA

A news despatch from British Columbia states: "Although this province produced the bulk of copper mined in Canada, British Columbia has only three small plants manufacturing brass and copper articles, with an annual production of $57,314, as compared with 59 manufacturing plants in Canada, with an annual production value of $13,760,311. The bulk of the manufacturing plants are in Ontario and Quebec. Ontario has 39 plants, producing $6,774,066 worth of goods; Manitoba three, producing $955,998; Quebec twelve, producing $5,525,153; and New Brunswick two, producing $477,780."

It has been pointed out on numerous occasions that although Canada produces almost, if not quite, sufficient copper to meet her own needs, most of it is exported in the raw form and imported again as manufactured materials or as a raw product for our factories. Stated thus badly one is liable to draw a wrong conclusion. The statement ignores the segregation of our producers of copper in the extreme west and of our principal manufactories in the east. If the Rocky Mountains were less of a barrier to freight traffic than they are, the apparent anomoly of our exports and imports of copper would be less striking.

It is certain, however, that this unsatisfactory export of our copper and the importing of its equivalent from mines in the western United States only a few hundred miles less distant can be lessened by means of a determined and systematic effort, particularly if there were effective and continuous co-operation between the producers in the west and the consumers in the east. It is to the solution of problems such as this that the efforts of the Trade Associations now in vogue in Great Britain have been applied with such signal success. The vast majority of our specific trades including the copper and brass trade, still lack the aid of this most effective expedient. Also, the natural geographical division of our country into East and West, overcome in the first instance by the superb efforts of those that built the Canadian Pacific Railway, still effects us adversely, and to some degree unnecessarily. We are confident that if Canada's cop

per trade can develop an advocate with qualities approaching those of the men who built our first transcontinental railway, our own copper will find a much more extended use within our own borders.

AN EMPIRE COUNCIL OF MINING ENGINEERS

In these days the bonds of Empire are being forged with a rapidity that would startle most of us if we could realize it fully. In the pre-war times the bonds that united the scattered bits of British red that dot the globe were largely the rather intangible feelings of consanguinity, racial sympathy and sentiment, with a more tangible manifestation in trade and in material interests common to all. Since 1914 we have had many clear-cut evidences of the fact that the Empire is one and indivisible. A fresh item of evidence is recorded in our pages today.

We wish to draw attention to the report, in Mr. Roland H. Briggs' account of the recent annual meeting of the Institution of Mining Engineers in London, of the official proposal to form an Empire Council of Mining and Metallurgical Engineering. This is a move of decided importance to the mining engineers of the Empire's component parts, as well as to the Empire as a whole.

There is being developed rapidly, by various means, an inter-Imperial interest in mining affairs that promises much good for the Empire. Chief among the agencies at work is the Imperial Mineral Resources Bureau whose activities and reports have had some notice in these pages. The personal contact and personal interest that would be fostered by the proposed Empire Council of Mining and Metallurgical Engineering would go far toward supplementing the good work already being done to consolidate the interests of the mining engineers of all the British dominion, for the ultimate benefit of all.

EDITORIAL NOTES

Today we quote, at the top of these pages, a sentence from a speech of the Governor-General, Lord Aberdeen, to the Canadian Mining Institute twenty-five years ago. The tone of this sentence pervaded his whole speech. It is evident that the members of the Institute of that day, when the gold boom of Northwestern Ontario was rising to its height, realized its folly and were actively concerned to prevent the dissipation of capital they saw going on. We wonder if the shade of Lord Aberdeen visiting the 1923 meeting of the Institute, will find its members equally jealous of their profession's good name. We hope so.

The verse "Prolepsis" in our issue of November 10th, addressed to the C. I. M. & M. meeting in Vancouver, has inspired a Gallic bard on the Pacific, as evidence below. It is no breach of confidence to say that he acquired the art of producing these rolling cadences on the Atlantic side, where a profound study of the Greek language is apparently still in vogue.

The trade returns for Canada for the twelve months ending October, 1922, include the following items:

Imports	
Iron and its Products	$120,901,813
Non-Ferrous Metal Products	33,649,163
Non-Metallic Mineral Products	116,654,048
Exports	
Iron and its Products	$38,087,096
Non-Ferrous Metal Products	34,747,516
Non-Metallic Mineral Products	23,058,672

These figures may well provide food for thought for all Canadians, and particularly for the mining engineers and metallurgists of Canada, upon whose initiative and resource our country must depend mainly to stop this annual drain upon income.

THE FOURTH ANNUAL GENERAL WESTERN MEETING OF THE CANADIAN INSTITUTE OF MINING AND METALLURGY — 1922

EPANALEPSIS

From where Atlantic roars with sullen surge,
There came Odell, sent hither by the urge
Of travel. On his train he brought
Leaders in the domain of mining thought
Camsell and Wallace; Allan; Whiteside too,
And Burrows, Shanks and Richards, all to do
Their utmost at Vancouver to make clear
The value of these meetings once a year.
McLeish and Haanel came and many more
Representation right from shore to shore
As was predicted, Wilson too was here,
Philosophizing in his way sincere
On many things. And two at least
By watches know his bounty at the feast.
Not only from our eastern marches wide
Did members come, but also from outside
Our land, Rickard laid down the laws
Of journalism amid much applause;
And L. K. Armstrong with his silver tongue
Described the peaceful boundary so far flung
But one was absent. One we did not see
Stalking the corridors. And fain would we
Have had him in our midst—cloud piercing Spike—
If only at his polleies to strike!

* * *

'Tis over. This Fourth Meeting in the west
Undoubtedly has been the very best
Of all yet held. And from Vancouver's isle
To far Cape Breton here convened the while
Men who brought freely to the Council board
Their store of knowledge, and disdained to hoard
It from their fellows. May the fashion be
Always thus in our mining industry!

CABER FEIDH

The Shear Zones of Porcupine

WITH SPECIAL REFERENCE TO THE ANKERITE MINE

By J. C. MURRAY

The object of this article is to correlate certain geological facts, some of which have not yet, so far as the writer is aware, been assigned their rightful places in the written history of the gold deposits of Porcupine, Ontario. The article is based in great part upon the records of work privately carried on. Acknowledgement of this is made hereunder. It is also the writer's wish to express unequivocally his indebtedness to the publications of the Ontario Department of Mines. Without these necessary guides the geology of Porcupine would still be an unopened book.

* * *

Space does not permit the full setting forth of the writer's premises. A seemingly dogmatic tone is, therefore, to be overlooked as being unavoidable.

Introductory

In the first days of Porcupine the prospector looked for quartz. Quartz veins were veins, and therefore to be staked, no matter what their surroundings nor how uncompromisingly "tight" the rock in which they were found.

Very early it was found that veins in the vicinity of porphyry contacts showed better values than did those not so situated. Almost contemporaneously it was noted that, in the zones of schisting induced by porphyry intrusions, the silicified schists were more or less impregnated with sulphides and sometimes gave interesting assay results. This directed attention to the schists themselves, rather than to the true ore bodies within them, and encouraged exploration along zones of such schists. Schist was looked upon as ore *per se*. The outcome was disappointment.

This and other illusions have not yet been entirely dispelled, although later experience has proved that, where these schists *are* ore, they are only incidentally so because of distinctly traceable influences. Putting it another way, the schists have shared incidentally the enrichment of the true ore bodies.

The Process of Ore-Making

The original silicification of the schists, manifested in the networks of quartz veinlets, was but one step in the general enrichment, or, rather, in the processes preceding enrichment. It is not yet generally recognized that shearing and structural deformation within the zones of schisting were pre-essentials of ore-making. That these were essential factors has been proved abundantly within the last year or two by underground development at the most important mines. The first systematic demonstration, however, was afforded by the exploratory work planned and carried out at the Ankerite mine.

Where intrusive porphyry has brought about only schisting and silicification, the one later, but prime, factor is missing. Schist may, and does, carry gold over wide areas, in non-commercial quantities, but so also do other metamorphic rocks. The missing factor is supplied when, in addition to schisting, shearing and deformation also have occurred.

In such cases the schisted zones have been fractured, usually, as at the Ankerite, at a low angle to both the strike and the dip of the schist. Following this, the fractures were filled by the agency of highly siliceous, enriched solutions of deep-seated origin.

Local enrichment (the formation of ore-shoots) resulted from structural deformation of the already fissured schist. Intense folding and faulting of the schist, and dislocation by masses of intruding porphyry and lateral thrusts, afforder the stoppages, or "dams," which, by obstructing the flow of the ore-bearing solutions through the fissures, made possible the local enrichments that constitute Porcupine's important ore bodies.

Enrichment at the Ankerite follows observably the folding and faulting traceable on the surface.

Differentiation of Vein Matter and Schist

That there is a fundamental difference between the quartz deposition in the veins and the earlier silicification of the schist, is apparent on inspection. The well-marked vein walls are characterized by an abrupt change from sericitized to unsericitized rock, and by more or less lamination of the wall rock. Moreover, the higher and more consistent gold content of the vein filling as compared with the silicified schist, the marked difference in the appearance of the sulphides, and the presence of tourmaline in the vein filling, distinguish it sharply from the surrounding schist.

There is much evidence to show that the vein filling is of later date than, and of origin entirely different from, the silicification of the schist. In the opinion of the writer the silicification of the schist was essentially local, a phase of contact metamorphism, resulting wholly from the first intrusive action of the porphyry. The vein filling, on the other hand, was a concomitant of the later shearing, and involved the release of pregnant solutions of profound origin, under great pressures and at high temperatures.

An extract from a paper on the ore deposits of Butte, Montana, is appropriate here : "It is a reasonable assump-"tion that the quartz-prophyry was derived primarily from "the parent granite magma; and also that the ultimate "source of the ore minerals was the granite magma. The "principal part played by the quartz-porphyry has appar-"ently been the preparation of the way for vein-forming "waters of deep-seated origin to reach the regions where "the ore deposits are now found.

"While the ultimate source of the metals was probably the "original granite magma, the direct source may have been "the same magma locally which furnished the quartz-por-"phyry, the latter rock following the earliest fracturing "and at the same time stimulating an upward movement of "the ore-bearing waters."* In passing it may be pointed out that the close association of ore and porphyry in the Porcupine region does not necessarily imply that the latter is the original source of the ore.

The pronounced difference in the appearance of the pyrite that is found in the silicified schist and that found in the vein filling is significant of the different origin. The sulphide found in the schist is sprinkled irregularly in distinct cubic crystals. The granular pyrite that characterizes the ore bodies is micro-crystalline, lighter in colour than the former, and much more plentiful. It (the vein pyrite) is grouped in fine-grained bunches, and not thinly sprinkled as is the pyrite in the schist. Moreover, the pyrite in the schist is low in gold content, while the vein py

*"Ore Deposits at Butte, Mont.," by Reno Sales, Trans. A. I. M. E., Vol. XLVI

rite, along with tourmaline, is always associated with high gold content in the ore.

No tourmaline has been found in the schist, but it is plentiful in the vein filling. The occurrence of tourmaline in the vein filling has all the significance that the practical prospector used to attach to the word "indicator." The dark coloration of a great deal of the vein quartz was found, on examination under the microscope at McGill University, to consist of fine needles of tourmaline. Visible crystals of the mineral are found occasionally but not frequently.

Structure and Vein System

The writer has been permitted to make use of a private report* that presents clearly the facts on which the above statements are based, and that embodies the results of the first work done in the Porcupine camp guided by a knowledge of local structural relationships. The work done at the Ankerite specifically determined these relationships and threw light upon the nature and causes of local enrichment. The essential role played by structural deformation was evident early in the progress of surface exploration.

The conditions encountered at the Ankerite on the surface were duplicated underground at the Dome and McIntyre. At the Ankerite the surface work rendered the structural geology diagrammatic in its simplicity. Underground, at the other mines, interpretation came more slowly. At the McIntyre, for instance, a number of veins have been cut in the sheared schist which underlies the body of porphyry pitching into the former property at depth from Hollinger ground. The discovery of these veins was the result (and the reward) of bold and reasoned underground prospecting. It revealed conditions strictly analogous to those demonstrated on the surface at the Ankerite. In the case of these McIntyre veins it is recognized that the intruding porphyry has acted as a "dam" in localizing gold deposition.

At this point it is appropriate to quote from the private report referred to above: "It appears probable, from both the local and the broader features of the field, that there has been a profound faulting of the country for miles in a general N. E. S. W. line, with local lateral thrusts at approximate right angles to the general direction of shearing. Spurs of fissuring and faulting also extend as subsidiaries from the general line. But the main movement, with its lateral thrusts which tend to give it something of a zig-zag course, has been the chief conditioning factor. The Dome, West Dome, and Ankerite mines, and other known deposits, lie in the main line of movement, both the Dome and the Ankerite deposits lying in zig-zags, or elbows, of the cross-country faulting."

One feature of the metamorphism of the schists that has been much misunderstood is discussed in the report in question, and emphasis is laid upon a point that has long needed attention. "I wish to call especial attention to the nature of the so-called 'ankerite dykes,' because of the general looseness and confusion of ideas concerning them.

"High carbonate content is a feature of practically all altered rocks of the Porcupine area, and practically all rocks of the Porcupine area are thus altered, the degree of alteration corresponding closely to the intensity of structural changes. In some localities the carbonate schists carry considerable iron carbonate and iron sulphide and weather to a rusty appearance, which has given rise to the misnomer 'ankerite dykes.' Although these carbonate schists often contain stringers of quartz that may be rich in gold, they offer no possibility of profitable mining."

*Report of Clifford E. C. Smith on the Ankerite Gold Mines, Porcupine, Oct., 1918.

The supposition that these rusty schists were the object of attention at the Ankerite gave rise to misapprehension as to the real purpose of the work done there. The intensive geological investigation conducted on that property proved conclusively that the highly mineralized fillings of the shear fissures constitute the payable ore bodies, and that these occur in the form of parrallel and continuous veins in two distinct zones.

To proceed, the report touches thus upon the vein systems: "The pofitable gold deposition of the Ankerite property lies in strong veins which cut the rusty carbonate schists and the several other rock phases, including the intrusive porphyry. . . . . These veins occupy lines of profound fissuring cutting the schists on both the strike and the dip, and their filling consists of quartz carrying iron pyrites and fine needles of tourmaline. The observable proportion of original and secondary carbonates (dolomitic content) is generally lower than that of the Hollinger ores, and distinctly lower than that of the Dome run-of-mine."

Segregation of Gold

Again: "The highest gold values appear to result from the association of quartz, tourmaline, and pyrite. . . . . This association is most predominant towards the centre lines of the veins, while the tourmaline thins out and disappears and the pyrite becomes less plentiful and takes on more marked crystallization towards the walls of the veins. The walls themselves carry low gold values for varying widths from the veins proper. In most veins of the Porcupine area quartz and carbonate form the basis of the vein filling. Generally silica predominates strongly over the carbonates in the Ankerite deposits, but there are some portions of the veins where carbonates predominate and here the gold content is reduced. This is characteristic of all Porcupine veins . . . . . When tourmaline appears in Porcupine ores it generally implies a high gold content, although this fact does not seem to have been much noted. . . . At certain points, pipes and masses of porphyry are mixed with the vein-stuff and, although not highly gold bearing in themselves, in fact tending to reduce the grade of the total to be mined, they appear to enrich the vein-stuff proper at such points. This is typical of the action in the ore bodies of Porcupine. It is desirable, perhaps essential, in proximity to the veins, but undesirable when intermixed."

General

In the Porcupine zones of schisting, gold is very widely distributed. No veins are entirely barren. But only under certain favourable and discoverable conditions are veins payable. The metal has been deposited thinly except where the right combination of conditions has prevented its dissipation and, by local stoppage of the gold-bearing solutions, has forced these solutions to deposit their load.

"Obstructions, as well as openings," says Penrose in his excellent paper * on ore shoots, "in a fissure may in some cases have an influence on the position of ore shoots. Obstructions may occur where the walls are locally pressed together, or where the fissure makes a curve or is faulted.

"Any of these obstructions may influence the formation of ore shoots by locally checking the speed of the ore-bearing solutions that come in contact with them, thus encouraging deposition."

Summing up, then, the points that the writer seeks to emphasize are:

1st. Gold-bearing schists in the vicinity of porphyry do not in themselves constitute ore.

2nd. The presence of quartz veins, schist, and porphyry

*Some Causes of Ore-Shoots, by R. A. F. Penrose, Jr.

does not necessarily imply the presence of payable ore.
3rd.—The pre-requisite for the deposition of payable ore has been structural deformation of the fissures that lie within the schist.
4th.—There is a genetic difference between the mineralization of the veins and that of the schist.
5th.—Whilst enrichment need be looked for only under the right conditions, the right conditions may be found without the gold.
6th.—The chief function of the intrusive porphyry has been to release the ore-making solutions that filled the fissures ready for their reception.

Canada's Mineral Resources

DR. CORLESS DEMONSTRATES THAT SOUND DEDUCTION IS THE BASIS OF PROGRESS

To the Editor, Canadian Mining Journal.

Sir, — Absence for about two months delayed my reading of recent issues of the *Canadian Mining Journal*. I have no desire to prolong the controversy begun in the C. I. M. M. *Bulletin* regarding the extent of Canada's Mineral Resources, which is one of the main subjects Mr. Campbell discusses in your issue of November 3rd. However, the statistics he furnishes, valuable as they may be for other purposes, are so entirely valueless as a contribution to the discussion of this matter, and the inferences he draws from these statistics are so unjustifiable, that I am not surprised that he has learned so to distrust his own reasoning regarding our national mineral resources as to discard the use of inference altogether and to pin his faith to observation and measurement exclusively—a method quite essential in estimating the ore reserves of a developed mine, but wholly useless for forecasting the extent of national mineral resources. But let me repeat what was said last March: "The mining engineer who does not look beyond the ore he can measure, who is not intent on using ascertained facts as a stepping stone to probabilities, will not get very far." Mr. Mickle has shown mathematically, as I have in more general statements (in order to reach a wider circle of readers), that the probability in the case under discussion is so great as to reach a higher degree of certainty than that obtaining in the case of results usually accepted as estimates of ore reserves. The greatest fallacy underlying both this letter and those of Mr. Campbell published in the C. I. M. M. *Bulletin*, is in the unwarranted assumption that since we cannot estimate our national mineral resources as we do the developed ore in a mine, we are not justified in making any inferences as to their extent.

Our Mineral Wealth is Potential, but Real

After making the familiar reference to misuse of statistics, Mr. Campbell invites your readers to judge whether he has drawn any unwarranted conclusions from those he gives, which invitation I am accepting. He then prefaces his first statistical table with this statement: "The annual mineral production is, generally speaking, an indication of the mineral wealth of a nation" (country?). If "nation" is not used in the sense of "country", as I have suggested in parentheses, then the statement is meaningless in this connection. If it is used in this sense, the statement is so absurd as hardly to need refutation. The mineral wealth of Canada (using the expression, 'mineral wealth,' in the sense already defined in the C. I. M. M. *Bulletin*, which sense he has already accepted) was in existence before the white man occupied the country, as well as when the early white settlers were too busy with hunting, fishing and clearing their farms to give any serious thought to the minerals of the country they were beginning to occupy.

But this is the very crux of the discussion. As I pointed out last March, in the pioneer stage of development of a country, which stage Canada has not yet left wholly behind, there is, broadly speaking, a natural succession to the beginning of its basic industries. In this succession, unless the development is carried on as foreign exploitation, mining generally comes last. This is why mining is the least developed of our basic industries in proportion to the resources with which this industry is concerned; why it is just beginning to come into its own; why the Canadian people are only now beginning to take a broader view of Canada's mineral resources; why an effort was made last March to assist Canadians to realize the meaning, from the standpoint of the mining industry, of the great physical and geological features of the country; why inferences, amounting to reasonable certainties, were drawn from these features and the important mineral discoveries already made. How then can the annual mineral production of Canada, at the present time, indicate in any way the extent of its mineral wealth? On the contrary, the present relatively low mineral production, either in total or per capita, points to the pioneer stage of the mining industry. This table of statistics, therefore, chiefly directs attention to the fact that the mining industry in Canada is as yet only in its infancy. In no sense can these tabulated figures be considered as furnishing any kind of measure or indication of Canada's mineral wealth. Similar remarks apply to the second table, giving the value of production of certain selected industries for 1918. These figures bring into clear relief the relatively pioneer stage of mining when compared with other industries. Both tables, properly interpreted, serve to emphasize the serious responsibility resting on mining engineers of making known, on every suitable occasion, the splendid opportunities Canada affords in this industry.

Present Imports should Stimulate us to Domestic Production

Mr. Campbell's next table, giving a list of Canada's mineral imports, metallic and non-metallic, points in the same direction. With very few exceptions, Canada has in abundance the raw materials (minerals) listed. This list, properly regarded, should act as a stimulant, not as a depressant, to mining engineers to redouble their efforts to direct attention to our enormous unprospected areas and to bring to the notice of the public the significance of these areas, as shown by the results already achieved and continually being obtained in similar areas already prospected. The list

of metallic and non-metallic materials imported into Canada, both in the raw and manufactured state, is no more an indication of limitation of Canada's mineral resources, than would a list of importations of farm and forest products, raw or manufactured, serve to show limitation in the extent and value of these resources. Such a list, properly interpreted, might, however, be useful in calling attention to climatic conditions in these products, but this would merely add confusion to the issue under discussion. Just so, the importations of metallic and non-metallic products, if properly interpreted, may be useful in showing the need of directing attention to the fact that we should push the exploration and development of mineral resources, or to the fact that we do not at present carry out the manufacture of certain of our metals in this country, which might usefully lead to a study of the economic reasons for this. But by no stretch of imagination can such tables, or any other statistical tables of this kind that can at present be compiled, furnish any evidence as to the extent of the mineral resources of Canada not yet mined nor even developed. For this purpose, as was clearly stated last March, "we must pass from accurate and slowly acquired knowledge to reasonable inference, if we are ever to form any kind of estimate of our mineral heritage." The inferences then made and the grounds for them were carefully stated, and have been restated, in part, in letters to the *Bulletin*, with some additional data and further grounds for the reasoning, not then permissible because of time and space limitations. Mr. Campbell has furnished some useful information and offered interesting criticism in his letters to the *Bulletin* and *Journal*. But what he has said has served rather to confirm, to bring out more clearly, and to emphasize the soundness of the reasoning employed at the last annual meeting, than to discredit the conclusions reached or to prove the fallacy of the method employed in reaching these conclusions. For these further opportunities to clear up any obscure points and to re-emphasize the importance of our mineral resources, I have to thank Mr. Campbell. Never in any single year has more additional evidence been added, pointing to the substantial soundness of the inference regarding Canada's mineral resources then made, than in the year now nearing its close. I can only hope that the discussion then and since has been of some assistance in directing the mind of the public to these.

Coal Reserves

Far too much credit is given me by the author of this letter in referring to my "statement that we have 1231 billion tons" of coal and lignite. I was at considerable pains to give Dr. Dowling the credit for compiling these figures for the coal report of the Twelfth International Geological Congress, from which I explicitly stated that the figures were *culled*. If Mr. Campbell knows of a later or more dependable figure, he will confer a favor on your readers by giving it. Nor did I say that this fuel would be "*good for* 35,000 years, at the present rate of consumption." Let me quote what I did say: "This inconceivably large figure 1231 billion of tons, roughly 35,000 times Canada's present total annual consumption, baffles the imagination. It is nearly sixty per cent greater than the estimated reserves of the whole of Europe, nearly equal to those estimated for the whole of Asia, and one-sixth of those of the entire world." This is very different from saying that our coal and lignite resources would be "*good for* 35,000 years." No such idea entered my mind. These statements, by any unprejudiced reader, will be understood as they were intended — to assist the mind to come as nearly as possible to grasping what this baffling figure means. We do not need to consider what percentage of this vast quantity of fuel may appear at present to be of little or no value. Our greatest fuel problem is not possession, but transportation — a problem not yet seriously tackled, but one which Canadians are sure to tackle in the not distant future.

The Optimistic Engineer

You have done me the honor of calling me an 'optimistic engineer', whatever this may imply. Optimism, if I understand the word correctly, expresses the view or belief that everything in nature and history is ordered for the best. Hence an optimist must believe in the ultimate good of everything, even of seeming evil. I am unaware of any statements of mine that imply that I hold any such view. But I *am* a believer in scientific method; in scientific induction and deduction as among the most powerful instruments the human mind has forged for the advancement of knowledge, provided always that these methods of reasoning are soundly based. Nothing is more dangerous than a seeming induction or a superficial deduction. Many engineers, I fear, allow their minds to become so engrossed with their daily grind as to fail to grasp the great power of reaching out into the unknown and of drawing reliable conclusions, which these mental instruments place at their disposal. Facts and data alone are dead material. They become significant, vital, of far-reaching import, only when they are gripped and interpreted through these mental processes. If the belief, that human progress must come chiefly by trusting and accepting the results of human reason as a basis for action in mundane affairs, entitles me to your application of the epithet, 'optimistic engineer', then I have no objection to your use of the term.

C. V. CORLESS

Coniston, Ontario.

The cost of experimental research on a commercial blast furnace is prohibitive, due to the enormous investment required to build a single stack and its perquisites and the cost of a 'freeze up' which would inevitably attend destructive experimental work. Still, the reactions in the blast furnace are far from perfectly known, and full knowledge might be of incalculable value. Consequently the United States Bureau of Mines has erected, at its station in Minneapolis, a small blast furnace which is hoped to conduct a thorough research. [illegible] and has been found to [illegible] satisfactorily the operation of the full-sized stack.

There has been discovered lately on the northwest part of the Iran-Yard near the border of Beckingham a stratum of basket that has been [illegible] to be gold bearing to the degree of [illegible] at least some spots. It is hoped that further [illegible] will show that the gold [illegible] will be sufficiently large to warrant [illegible] has been commonly reported in South Yorks during the past year that another Rand [illegible] do not warrant this conclusion.

Mining Engineers in England

INSTITUTION OF MINING ENGINEERS HOLD ANNUAL MEETING

By ROLAND H. BRIGGS

The annual meeting of the Institution of Mining Engineers in London (England) on November 16 and 17, was of even greater social and technical interest than usual. H. R. H. The Prince of Wales attended the dinner that the Institution, together with the Institution of Mining and Metallurgy, gave on the first day, and at which the Medal of the Institution of Mining Engineers was presented to Sir George Beilby, LL.D., F.R.S., in recognition of his contributions to science, with special reference to his researches on fuel. At the opening meeting the President, Professor Sir John Cadman, K.C.M.G., D.Sc., presented the report, and referred with special cordiality to the visit of the representatives of the American Engineering Societies and to the election of Mr. Ambrose Swasey and Mr. William Kelly as Honorary Members of the Institution at that time.

Sir John Cadman's Presidential Address

Sir John Cadman subsequently delivered his presidential address, emphasised the work the Institution was doing towards the prevention of accidents in coal mines and the problems relating to the winning aand working of collieries, ventilation, and the advancement of the general science of mining engineering, and showed how very greatly the percentage of fatal accidents in coal mines in Britain had been reduced during the past seveuty years. He suggested that the Institution should concentrate strongly on the problem of explosions from coal-dust.

In a very important paragraph he also said, "Our two Councils, (those of the Institution of Mining Engineers and Institution of Mining and Metallurgy) have adopted a proposal for the formation of an Empire Council of Mining and Metallurgical Engineering. The sister Institutions in the British Isles and the Dominions will be invited to co-operate with us as equal partners in the constitution of its Council. Its functions will be to create and maintain throughout the Empire a high standard of technical efficiency and professional conduct; to strive for the safer working of mines within the Empire; to convene at regular intervals an Empire Mining Congress, the first to be held in connection with the British Empire Exhibition in London in 1924, and subsequent congresses in the Dominions; to establish, if thought necessary or desirable, a Register of British Mining and Metallurgical Engineers; and to serve as a medium of communication between the co-operating Institutions and to promote the interests of the professions and industries connected with them."

Spontaneous Combustion by Crushing

Five technical papers were read and discussed at the meeting. The first of these was by Professor Henry Briggs, D. Sc., Ph. D., on the possibility of spontaneous combustion being initiated by the heat produced in crushing. A rise in temperature is produced when any rock is crushed, owing to the conversion of mechanical energy into heat. It is possible that sufficient heat to start the process of self-heating may be evolved in this way during the crushing of coal in pillars and wastes. The object of the investigation carried out was to investigate whether this, the primary or physical effect of crush, is one of the responsible agents in spontaneous combustion.

Professor Briggs dealt with the expenditure of energy involved in cruhing rocks, and the conversion into heat of the work done in crushing, with the experiments of Mallet, with data that have been obtained from the use of coal pulverisers, and from the crushing of coal measure shale, with the rise of temperature in the mass of mineral after the heat developed in crushing has permeated the mass, with the relation between the size of the particle and the mass temperature, and the whole action of crushing. The paper went into the subject with great detail and a good deal of mathematical data was given.

The investigation has led Dr. Briggs to conclude that the production of heat by the act of crushing or grinding coal or carbonaceous shale is one of the causes leading to the spontaneous combustion in mines, and in the majority of cases where it comes into play the direct thermal action of crush is probably confined to warming up the fractured particle sufficiently to start accelerative oxidation, which may be followed by active combustion. The rise of temperature induced by crushing is inversely as the diameter of the fragment produced. In a coal liable to spontaneous heating whether a crush or squeeze initiates such heating depends on the proportion of fine particles produced, since fine particles gain a higher initial temperature and offer a greater surface for oxidation.

A fragment of average bituminous coal 1/300th. inch in diameter, if suddenly produced by crushing, will, in the midst of similarly conditioned particles, obtain a temperature rise of about 52 deg. Fah. If the waste in which the crush takes place has a temperature of 75 deg. Fah. this particle will thus be raised, practically instantaneously, to a temperature of 127 deg. Fah. Under the same conditions a fragment 1/100th of an inch across will attain a temperature of about 92 deg. Fah. The importance of temperature rises of the size referred to in the initiation of spontaneous heating is shown by the fact that the difference between summer and winter temperatures in Britain, only about 23 to 24 deg. Fah., has a considerable effect on the firing of coal cargoes on ships. The heat of crushing is generated at the surfaces of the fracture and rapidly distributed through the particle. The temperatures produced by crushing hard rocks suddenly and finely are considerable. The rise in temperature from crushing coal measure shale is about 50 per cent. greater than that due to crushing average bituminous coal and where shale is more subject to spontaneous ignition that the coal in its vicinity, this may be due to its greater liability to crush or to the greater heat which it yields in crushing.

Mine Fires from Pyrites

An interesting paper on the spontaneous heatings and fires in the pyrites mines of the Huelva district in Southern Spain was submitted by Mr. A. O. Brown, B. A. This paper was the fifth report to the committee on "The Control of Atmospheric Conditions in Hot and Deep Mines." The ore is mainly an intimate mixture of iron pyrites and chalcopyrite, known as cupreous iron pyrites. The copper content averages about 1.5

per cent., sulphur 45-47 per cent., iron 40 per cent., with small quantities of zinc, arsenic and lead, and from 5 to 10 per cent. of insoluble silicate of alumina. The ore bodies are generally of great size, frequently 10 to 40 metres wide, or even wider. The lengths of the masses vary from a few hundred to 2000 metres. The depths vary from 100 to 500 metres.

The fires occur in the secondarily enriched zone where the softer and more easily oxidised chalcocite occurs, or in primary ore of unusual softness that has moved. It is believed that timber spreads but does not originate the fires. Spontaneous combustion caused by oxidation is the probable cause of all the true mineral fires. The fires are very difficult to extinguish, especially so near old workings where timber and blocks of ore have been abandoned among loose filling. In some cases flooding has been resorted to but usually cooling by means of the introduction of large volume of low-pressure air is advisable, as well as the mining out, as soon as possible, of the mineral in the troublesome area. The mineral probably approaches a temperature of red heat when on fire. Sulphur dioxide is produced in large quantities and the oxygen of the air diminished. After fires, the air in the working faces in the zones was not allowed to exceed 131 deg. Fah. and it was seldom possible to reduce it below 122 deg. Fah. Some kind of gas mask or respirator is usually employed, sponges, woollen respirators soaked with a 20 per cent. solution of sodium carbonate and Kohnig being used in different places, according as to whether the temperature or the dust and gas was the most serious trouble.

Subsidence of Land above Mine Excavations

The third paper read was by Professor Henry Louis, M.A., D.Sc., and concerned the problem of subsidencies. Professor Louis referred to the fact that in legal cases for claims for compensation sympathy is always with the surface owner, and in the absence of any clear theory with regard subsidencies it is difficult to prove that the colliery did not do the damage. If a coal seam is worked out to a certain line there will be a subsidence above the part worked out and a subsidence of gradually decreasing amount will extend backwards from the standing face, which is known as "draw". Careful measurements have shown that the average angle of draw in ordinary coal measure strata lying practically horizontal is between 5 deg. and 15 deg., being lower as the proportion of sandstone is greater and higher as the proportion of shale is greater. In Secondary strata the draw is about 25 deg. and in Boulder Clay or similar formations from 20 to 30 deg.

The amount of vertical subsidence to be expected in any given case cannot be predicted with any degree of certainty, for want of a sufficient number of recorded observations. When a coal seam is worked out over a considerable area, the immediate roof of the seam subsides by an amount equal to the thickness of the coal removed. But the strata are shattered and never squeeze down to their original form. Thus the surface settlement is never as great as the thickness of coal removed, but Professor Louis does not believe that there is any depth at which surface subsidence becomes zero. Professor Louis tentatively suggested a formula for calculating subsidence but pointed out that it was merely empirical, but corresponded to observed facts in a number of cases.

Breaking Down Coal by Gases

The fourth paper was also of a theoretical nature, by Dr. Rudolf Lessing, who described investigations he had carried out on the disintegration of coal by acids. He suggested that the getting of coal might be facilitated by the introduction of gaseous acid into the coal face through boreholes. Sulphur dioxide is used and is taken from a compressed gas cylinder and passed through a water bubbler by means of acid resisting tubes into the coal at practically atmospheric pressure. It is absorbed by the coal and there is no smell. The coal is disintegrated and the cost of the gas is only small. Blasting would be eliminated. The scheme, of course, bristles with practical difficulties, as members pointed out. By a practical experiment at the end of the meeting, Dr. Lessing, however, certainly demonstrated to members that the gas undoubtedly had the effect claimed of disintegrating the coal.

A New South Wales Coal Field

The fifth and last paper of the meeting was a description of the "Greta and South Wales Coalfields, in New South Wales," by Dr. J. R. M. Robertson. In this description the field was very fully dealt with, the original geological features, methods of coal getting, labour conditions, chemical and physical properties of the coal, history of the field and details of some of the individual collieries, being included.

The paper was closed with a warning with regard to the field. The coal resources of New South Wales are often believed to be sufficient for thousands of years, but this is not the case. The majority of the known seams are of inferior quality, and for these so far there has been an insufficient demand. The output of the State has been drawn solely from a few really good seams, and these are fast hastening to their end. The greater part of the reserves doubtless exist under difficult and inaccessible ground and are practically unproved.

The meetings at which these papers were read were well attended by representative and influential mining engineers, and it is perhaps important to point out that the three suggestions relating to the initiation of spontaneous combustion by the heat produced in crushing, the theory with regard to subsidencies, and the use of sulphur dioxide for the disintegration of coal underground, were somewhat adversely criticised by many members present.

PROGRESS ON CONTINENTAL

Private advice from New York is to the effect that Mr. R. C. Warriner, president of Continental Mines has returned recently from an inspection of the properties at Cobalt and Kirkland Lake. He is reported as quite enthusiastic over a recent discovery on the Kirkland property by means of surface trenching. A promising ore body has been disclosed on surface and has been traced for some distance, with most encouraging assays. Mr. Warriner has instructed the local manager to start sinking a shaft immediately.

As Mr. Warriner is a mining engineer of long experience in gold mining, it can be assumed safely that Continental has now, after a full season's geological study and trenching, located its first undoubted ore shoot. Having delineated it by stripping on the surface in its horizontal direction the management will now examine its value and grade in a vertical direction. Unless the Continental ore shoot should prove to be radically different from the adjoining Kirkland properties on the same break it has now commenced definitely on a career of productiveness.

It has been demonstrated that, on account of unusual difficulties in handling and extreme fine fineness, and approximately $85 a ton now to melt and that direct concentrate than gravity concentrate.

Canadian Graphite to Lead in the World's Market*

Ceylon Mines, Practically Exhausted—Canadian Product Equal in Every Respect — Flotation Process Makes Production Profitable

By H. P. H. BRUMELL

Graphite is a mineral and an allotropic form of carbon of which charcoal is the lowest and diamond the highest form. It is crypto-crystalline, steel grey to black in color, lustrous, lubricous, scetile, very soft and has a specific gravity of from 2.1 to 2.3. It is also highly refractory and has high electric conductivity.

The mineral is known under three names: graphite, plumbago and black-lead, which are used in the trade to distinguish the three different forms in which it occurs, thus: the word graphite is used for the flaky product derived from disseminated ore, plumbago for the crystalline material filling veins or pockets, and black-lead for the earthy or so called amorphous variety. According to the country of origin the trade also uses the three synonyms, thus: Ceylon plumbago, Canadian or American graphite and German black-lead.

Graphite is a prosaic mineral and but little known to the general public, the average layman thinking of it only in connection with pencils and stove polish or as a lubricant in connection with automobiles. No glamour attaches to it as in the case of the precious metals yet it is probably a much greater essential than either gold or silver, nor has any substitute been found for it in its principal uses. It is absolutely essential in the melting and moulding of most metals, in electricity, certain lubrication, lead pencils and stove polish, and is used in a variety of other purposes, the proportions entering into the various trades being approximately as follows:—

Crucibles and refractories	65%
Lubricants	10%
Foundry facings and stove polish	10%
Pencils	7%
Paints	3%
Other uses	5%

If value rather than quantity be considered over 75% should be credited to crucibles and refractories.

In nature the mineral is found in two forms known to commerce as crystalline and amorphous, the latter being very widespread in its distribution, while the crystalline variety is restricted, being confined to crystalline rocks of pre-Cambrian age or metamorphic crystalline rocks of a later period. Thus the disseminated graphites of Canada and New York states are of pre-Cambrian age while that of Alabama occurs in highly metamorphosed sediments of the Carboniferous series. For the purpose of this paper consideration of the crystalline variety only will be had.

Crystalline graphite occurs in commercial quantities outside of Canada in Ceylon, Madagascar, Bavaria and in the United States. In Canada the deposits are in Central and Eastern Ontario, in Labelle and Argenteuil counties, Province of Quebec, and on Baffin Island, the largest and most important being located in Buckingham township, Labelle county. Examining the foregoing occurrences both as to quantity and quality, it may be said that the product of Ceylon is probably the best known but, unfortunately, the deposits have been almost completely depleted and it is the express opinion of those most familiar with the field that it is only a question of a year or two before it is entirely exhausted. The field is small, as has been ascertained by the geological survey of the Island, and it has become a question of deep mining under very expensive conditions as the veins are very narrow and the occurrences such as to preclude systematic mining. In a confidential report to the Department of the Interior, Washington, July 7, 1918, by H. G. Ferguson and F. Grout, the following statement is made:

> "Although no definite data are available, it is believed that the production of Ceylon cannot go on much longer at its present rate and it is possible that the virtual exhaustion of the deposit is not far distant."

Madagascar has extensive deposits of disseminated ore but the refined material has been found unsatisfactory for the manufacture of crucibles, the most important of all uses to which graphite is put. In Bavaria there are somewhat extensive beds of low percentage dissiminated ore from which a very small sized flake is obtained and used locally. The field is not important. In the United States the only important fields are those of New York and Alabama, the ore, a disseminated one, averaging about 5% in the former and 2½% in the latter.

In Canada there are practically unlimited quantities of disseminated ore, assaying from 10% to as high as 30%. Of the known fields of the world those of Canada are by far the most important in extent, percentage of graphite content and quality of product. As may be seen on reference to the list of uses of graphite the making of crucibles is the most important, and it is for this purpose that the Canadian material excels, and it is through this use that Canada will in the next few years, dominate the world's graphite industry. During the past few years the governments of the United States, Great Britain and Canada have been making exhaustive enquiries and investigations as to an alternative source of supply of crucible graphite with the result that Canada has been shown to be the logical successor of Ceylon, which has hitherto supplied the world with this particular material. It was not, however, until the advent of the oil frothing flotation method of concentration had been perfected that it was possible to supply Canadian graphite at a price which allowed any profit to the producer. This perfection of process, coupled with the depletion of the Ceylon fields, makes the Canadian graphite industry a most profitable one.

A comparison of costs of production of crucible graphite, according to governmental and authoritative statement, shows the following:—*Ceylon.* All material shipped in crude form. Average cost per ton, f. o. b. port in Ceylon, about $112.00, according to report of United States consul at Colombo, January 1921. To this price must be added freight, insurance, commission, etc., and before the material is suitable for any purpose it must be milled and refined at considerable cost, the total increase over actual cost f. o. b. Ceylon being probably 40 p. c. *United States.* From "Information concerning Graphite" Committee on Ways and Means, House of Representatives

* From *Canadian Foundryman.*

Washington, 1919, it is learnt that the cost of production of graphite in the United States ranges from $120.00 to $280.00 per ton. *Canada* It has been proved at several mills that, from an ore assaying 10 p. c. only and with an extraction of 90 p. c. only of the graphite content the cost of production, with oil frothing flotation, is less than $50.00 per ton f. o. b. rail. From records in possession of the writer the factory cost at one mill was $44.00 per ton and at another approximately $47.00. It must be borne in mind that the Canadian material is finished and of high grade as against the crude material of Ceylon.

The following official assays of No. 1, or crucible stock, produced by Canadian mills as well as those of foreign graphite attest the superiority of the Canadian material:

Anglo Canadian Graphite Syndicate, 94.68%; assayer, A. E. Tucker, Birmingham, Eng.

North American Graphite Co., 96.30%; assayer, M. L. Hersey, Montreal.

North American Graphite Co., 94.40%; assayer, Mines Dept., Ottawa

Buckingham Graphite Co., 95.00%; assayer, Durand Woodman, New York.

Buckingham Graphite Co. 98.08%; assayer, M. L. Hersey, Montreal.

Dominion Graphite Co. 94.30%; daily average for two years.

Alabama 87.03%; assayer, United States Bureau of Mines.

New York 88.97%; assayer, United States Bureau of Mines.

Pennsylvania 88.80%; assayer, United States Bureau of Mines.

Ceylon 85.06%; assayer, United States Bureau of Mines

Madagascar 88.50%; "Foreign Graphite" A. H. Redfield.

For crucible making, size of particle, weight for bulk and purity are all important, and in these respects Canadian graphite is pre-eminent. In the matter of weight the specific gravity of the Buckingham, Que., material, according to G. C. Hoffmann, Geological Survey of Canada, 1876, is 2.2685, while that of Ceylon, according to the same authority, is 2.2591, and, according to F. G. Moses, United States Bureau of Mines, the Alabama product has a specific gravity of only 2.1. Regarding the size of particle, the crucible manufacturer's specification demands an evenly-balanced stock between the limits of 16 and 90 meshes to the inch which size is, of course, easily obtainable from the crude lump ore of Ceylon, the only disseminated ore affording a similar stock being that of Canada. The following table shows a comparative screen test of No. 1 produced in Buckingham, Que., and Alabama, U.S.:

Screen mesh.	Buckingham No. 1		Alabama No. 1	
	Separate p.c.	Cumulative p.c.	Separate p.c.	Cumulative p.c.
On 30	4	4	..	..
On 40	16	20	11	11
On 50	18	38	..	..
On 60	30	68	37	46
On 70	27	95	..	..
On 80	3	98	30	78
On 90	2	100	15	93
Through 90 .	..	..	7	100

The Buckingham stock, above, was produced under the old and very destructive method of dry concentration,

Entrance to one of the Workings of the North American Graphite Co., Buckingham Township, Quebec

while the Alabama material was produced by means of flotation whereby the size of particle is maintained. Notwithstanding this handicap in the methods of concentration it will be noted that 68% of the Buckingham stock stood on 60 mesh as against only 48% of that of Alabama, a very pronounced superiority in favor of the Canadian product.

The market for graphite is a constant one and is rapidly growing as its uses are becoming more generally known. Of late years there has been a tremendous growth in the demand for the mineral in the iron and steel and non-ferrous metals trades in electricity and for lubrication in which latter regard it is now being more fully appreciated. The markets of the principal consuming countries are approxmiately as follows:

Germany	40,000 tons per year
United States	35,000 tons per year
Great Britain	20,000 tons per year
Austria	10,000 tons per year
Czecho Slovakia	10,000 tons per year
France	5,000 tons per year
Italy	5,000 tons per year
Belgium	5,000 tons per year
Japan	5,000 tons per year
All others	15,000 tons per year
	150,000 tons per year

The world's production since 1900 shows a steady and marked increase, irrespective of the disturbed years of 1914-1918, as follows:—

1900— 81,683 tons	1910—116,004 tons
1901— 78,920 tons	1911—125,560 tons
1902— 81,901 tons	1912—136,510 tons
1903— 97,673 tons	1913—150,325 tons
1904—100,643 tons	1914—115,068 tons
1905—118,938 tons	1915—124,339 tons
1906—124,187 tons	1916—202,287 tons
1907—143,930 tons	1917—238,683 tons
1908—106,741 tons	1918—226,024 tons
1909—123,382 tons	1919—172,579 tons

In conclusion the writer would draw attention to the opportunity afforded to create, in Canada, an industry which would certainly dominate the crystalline graphite market of the world. It is a trite saying that "crystalline graphite occurs only in crystalline rocks" and of these we have in Eastern Canada the greatest development in the world covering, as they do, nearly the whole of the provinces of Ontario and Quebec. As has been stated the world is now looking for a new source of supply of crystalline graphite and it is understood that the Imperial Mineral Resources Commission is carrying on investigations with a view to aiding in the development of the graphite resources of the Empire as well as those of other refractories such as magnesite, talc, soapstone, etc. Dr. Charles Camsell, Deputy Minister of Mines, Ottawa, was recently in London in connection with this work. Many reports of both the Federal and Provincial Governments give evidence showing the great extent of our graphite land and the value of the ore and product as well as information concerning the treatment of the ore, markets, etc. That the

One hundred ton mill of the North American Graphite Co., Buckingham Township, Quebec.

United States Government is alive to the situation is evidenced by the many reports on both domestic and foreign sources of supply.

Careful investigations by prominent engineers and mining men of both Canada and the United States have shown that we have in Canada all the requirements for a very large and stable industry, the consensus of opinion being that it is a milling rather than a mining problem. The graphite occurs as a rock constituent of enormous masses of gneiss and limestone, the question of production being solely a matter of profitable concentration. The finished material has always been acknowledged to be of the highest grade and eminently suitable for crucible making, though it was not until the exigency of war-time forced it that it was openly acknowledged. Until 1914 it was understood by users generally that only crucibles made of Ceylon graphite would stand up to their requirements. World conditions, however, during the war changed all this, and it was proved that some of the other crystalline graphites were fully equal to Ceylon and the prejudice which had been fostered by Ceylon producers for nearly 100 years was broken down and the crucible maker now cheerfully acknowledges that he is willing and anxious to get his supply of suitable graphite where he can. Commenting on conditions in the Ceylon trade the "Report of Inspector of Mines, Ceylon," 1920, says:

> "In previous years there have been slumps in the industry, due to temporary lack of demand for plumbago, but the present slump is an entirely different matter, as the demand for plumbago is as great or greater than it ever was, only, unfortunately for Ceylon, the supplies are being obtained from elsewhere. The position could not very well be worse than at present."

The writer is in possession of the records of several mill run tests showing that an average extraction of 96.14% of the graphite content of the ore was recovered from ores averaging 15.41%, all in the Province of Quebec. For reasons that are obvious to the writer no reference to specific properties may be made though he is permitted to make public certain results obtained. At one property in the Province of Quebec a recovery of 97.84% was made from an ore assaying 13.75%. Of the finished material 56% was No. 1 or crucible stock, 19% was No. 2 or lubricating stock, and 25% was No. 3 or ground stock, the three grades assaying 94.40%, 90.25% and 73.10% respectively. At present market prices these would have an average value of $130.00 per ton, while the factory cost of production would be $44.00, a profit of $86.00 per ton of finished material, or a profit on each ton of ore milled of over $12.

If there be such a time as a physychological moment, that moment is certainly the present one in the matter of graphite mining and milling and it is to be hoped that for the credit of Canadians and their well known pride in their country's natural resources, the people of this country will take advantage of it. Our graphite is acknowledged to be the best for all purposes, the ore deposits are almost unlimited, the percentage of the graphite content is the highest known, the system of concentration has been perfected and, as the market is a large one and growing as the use of the mineral becomes better known, there are all the necessary factors for the making of a large and very profitable industry.

COAL PRODUCTION COSTS

Until a few years ago the accounting systems of the majority of coal operators of this country were extremely crude, and in many cases practically worthless. The National Association of Cost Accountants has published an article entitled "Coal Production Costs", by R. W. Gardiner, Commissioner of the Pittsburgh Coal Producers' Association, that will be found of great value as it bears directly upon accounting problems in this very important industry.

Before going into the technique of cost accounting Mr. Gardiner mentions the uses made of cost data by the operating, sales and finance departments, respectively. In connection with the payroll analysis which follows, he discusses the distribution of the three classes of labor in a mine, namely, direct (mining), indirect, and maintenance and repairs, and to what extent the superintendent or head of the operating department can control those divisions.

It is in the second, or indirect labor division, that the greatest leaks occur, in most businesses, and the coal industry is not an exception in this respect.

The distribution of supplies, and the royalties, depletion, depreciation and obsolescence are treated briefly. The differentiation between capital and operating charges is not as difficult to make in the case of a mine and other enterprises with wasting assets as it is in other lines of industry. In regard to charges to capital the author says:

"All development work after the opening of a mine is a proper charge against the cost of operations. This statement is based on the theory that no charges should be made to capital account unless the expenditure either results in an increased production or decreased costs."

At the conclusion of the booklet is an appendix prepared by the Research Department of the National Association of Cost Accountants. This appendix includes a summary of the main features of the uniform cost system of the National Coal Association, a summary of a system adopted by a number of Anthracite Coal Operators, and a brief note about two cost systems in the retail coal field.

Throughout the discussion there is a generous sprinkling of footnotes explaining certain technical terms peculiar to the coal mining business and footnotes referring to sections of the cost system of the National Coal Association that bear on or amplify points discussed in the main body of the text.

Copies of this pamphlet may be obtained from the office of the Secretary, National Association of Cost Accountants, 130 W. 42nd Street, New York. The price to non-members of the Association is seventy-five cents per copy.

The oil shales of Colorado have been explored with more thoroughness than those in most other parts of the world except where they have been worked, as in Scotland and Australia. The Colorado shales underlie an area of 16,000 square miles and are estimated to be capable of producing 20 billion barrels of oil and 400 million tons of ammonium sulphate.

Experimental work on the carbonization of lignite is being conducted in France with a view to making that country independent of foreign petroleum. If successful, considered by certain French technologists that will be granted the commercial success of this although France will still need to import oil.

LETTERS FROM READERS

The Institute's Professional Members

The Editor, Canadian Mining Journal.

Sir — In an editorial entitled "The Institute's Usefulness" which appeared in your issue of November 24th, you make the following statement:

"During the quarter-century of the Institute's corporate existence the practical direction of Canada's mining industry has passed gradually into the hands of technically trained engineers, the bulk of whom are now registered as Professional Members. The professional conduct of these engineers, and accessions to their ranks, are subjected to no systematic scrutiny, and are subject to no control outside the purely formal addition of their names to the Institute's list of Professional Members."

Just how you would propose to scrutinize the professional conduct of Professional Members is not stated in your article. I would, however, remind you that Article 13 of the By-Laws of the Canadian Institute of Mining and Metallurgy states that "any member may be expelled from the Institute for cause (on the recommendation of five members of Council or of any ten members of the Institute in good standing) by a two-thirds vote by letter ballot of the whole Council."

I would also draw your attention to announcements published on pages 722 and 723 of the June Bulletin of the Institute, which indicate very clearly that candidates either for election into the Institute or for transfer from one grade to another are subjected to careful scrutiny by—

(1) The names of candidates for admission to either membership or associate membership are posted in two consecutive issues of the Monthly Bulletin, after which these applications are handed to a Membership Qualifications Committee for consideration and recommendation to Council.

(2) Applications for transfer from one grade of membership to another are posted in two consecutive issues of the Bulletin before being presented to the Membership Qualifications Committee, who consider same and make their recommendations to Council.

In the case of Professional Members, the applicant for this grade must supply the Membership Qualifications Committee with minute details of his education and experience and must also submit the names of at least five members who shall satisfy the Committee as regards the fitness of the applicant.

Election to Professional Membership in the Institute, therefore, requires—

(1) Satisfactory replies from at least five sponsors to the Committee's request for information.

(2) That a summary of the applicant's career be brought to the attention of the members of the Institute through the Monthly Bulletin.

(3) Classification by a Committee appointed by Council, after a month has elapsed from the time that all members have been notified.

It is evident from the above that classification as a Professional Member of the Institute entails certain formalities, requiring on an average three months from the day the application is received before applicant can be admitted to this classification. It would appear, therefore, that you were not conversant with these requirements, otherwise you would not have stated that the addition of names to the Institute's list of Professional Members was a matter of pure formality.

GEO. C. MACKENZIE,
Secretary-Treasurer.
C. I. M. & M.

Montreal, Que.

NOTE. — We are pleased to have Mr. Mackenzie draw attention to the care exercised in scrutinizing the credentials of applicants for Professional Membership, to which allusion has been made frequently in these pages. But, if Mr. Mackenzie had read the paragraph quoted above once more in its context, he would probably have discovered that the formality to which we referred is not the act of admission to the list of Professional Members, but the existence of that list. The list at present is merely a reference list; the Professional Members do not co-operate, as such, in any activities whatever. It is the adoption of a definite policy and an active programme by these well-selected Professional Members that we advocate.—Editor C. M. J.

WAGES DECLINE IN BRITAIN

An important factor which has contributed to the more effective competition of British traders in foreign markets is the very considerable reductions that have been made in general wage rates in this country. According to statistics published by the Ministry of Labour, covering the leading industries of the country, it is estimated that, at the end of 1920, when wages were at about their highest level, the weekly full time rates for adult workpeople in the industries for which particulars are available averaged 170 or 180 per cent. above the pre-war figures, while, as the working hours in industries generally had been considerably reduced from about 48 to 60 before the war, to about 44 to 48, the increase was relatively higher. At the end of September, 1922, however, the increase on pre-war rates is estimated to have averaged about 75 or 80 per cent., so that within a period of about 21 months, a reduction of something like 35 per cent. has taken place. This decline in one of the most important elements of production costs was the inevitable sequel to the collapse of the post-armistice boom, while it has also contributed largely to the more recent increase in trade activity and to the reduction of 500,000 since January last in the number of unemployed. Relatively to the cost of living, however, the wage reductions, as a whole, are not so startling as at first sight might appear. At the end of December, 1920, when wages stood at 170 or 180 per cent. above pre-war figures, the index number was 165, but it had declined to 78 at the end of September, 1922, against a wage decline to 75 or 80 per cent. above pre-war. On this basis the reduction would appear to be more nominal than real, but it must be remembered that the preceding figures only relate to averages and that there is a considerable disparity between the relative increases not only in different industries, but also among the various classes of workers within those industries, while the wages again vary in different districts. Certain adjustments in the relative pre-war wages received by different workers was undoubtedly necessary, but it is evident that many inequalities still exist.—Monthly Review, Barclay's Bank.

Book Reviews

NICKEL (1913-1919). — Imperial Mineral Resources Bureau—H. M. Stationery Office, Imperial House, Kingsway, London, W. C. 2. — 56 pages. Price 1s. 7½d. post free.

This little review of the nickel industry, though naturally it can add little to the comprehensive report of the Royal Ontario Nickel Commission in 1917, gives some items of information that are not generally known. The present prominence and future promise of the Katanga copper mines in the Belgian Congo give weight to the statement that the blister copper contains about three per cent. of nickel and cobalt. Nickel is recovered from the electrolytic refining of blister copper in Japan, and the recoverable amount of nickel in the blister copper produced in the United States is about one pound of nickel per ton of copper — no small amount when one considers the annual production of copper in the United States.

The possibility of using the iron in the nickel ores of Sudbury is referred to briefly. "The Sudbury ores contain about 40 per cent. of iron. In every million tons of ore treated, 400,000 tons of iron, equal to one-half the Canadian production of pig-iron, is slagged in the furnaces and lost."

It is stated that pure nickel is malleable, and that the Mond process produces nickel that is 99.8 per cent. pure. This is, no doubt, the basis of the Mond Nickel Company's new malleable nickel plant at Clearfield, Pennsylvania.

The report is concluded by a bibliography, ten pages in extent, that includes references up to the end of 1921.

IRON ORE, PART 6 — FOREIGN EUROPE AND AFRICA. — Imperial Mineral Resources Bureau—H. M. Stationery Office, Imperial House, Kingsway, London, W. C. 2. — 275 pages. — 6s. 5½d. post free.

This volume, the last of the series on iron ore to be published, is particularly concerned, of course, with the well known minette ore beds of Lorraine and the magnetite ores of Sweden, Europe's chief sources of supply outside of Britain, and the relation of these to the British supply. In terms of iron content, France has 36 per cent., Britain 23 per cent., and Sweden 11 per cent. of Europe's known reserves. Britain's ore has a lower content in iron than the other two, but enjoys the advantages of abundant coal and sea transportation within easy reach.

In spite of their low content of iron (rarely reaching 37 per cent.) the minette beds of Lorraine constitute the most important single source of iron in the world at present. Their central position in Europe gives them a value that corresponds to that of the Lake Superior deposits on the North American continent. A self fluxing mixture of various kinds of ore from these beds is used. Elsewhere in central Europe the deposits of iron ore are characteristically of comparatively small dimensions and high in silica.

Since losing Lorraine, Germany's principal resource in iron ore is high-grade siderite, high in manganese, found in veins in the Siegerland district of Westphalia and siliceous hematite occurring in sedimentary beds to the south in the Dill and Lahn basins. Though these are only of second-rate importance. Germany's control of the Westphalian beds of coking coal assure her of a position of prime importance in the world's iron and steel trade.

Italy has no coal, but has blast-furnaces on the island of Elba, where important deposits of iron ore occur as veins and lenses. In Piedmont electric furnaces are used extensively to treat ore from the Val d'Aosta.

The ores of Norway consist mainly of low-grade magnetite requiring concentration. In Sweden, on the other hand, there are in addition numerous deposits of high-grade magnetite, which have been described fully on various occasions.

Russia has numerous and important deposits of iron ore, most of these being in South Russia and the Urals. At present the iron ore industry is at a complete standstill.

Spain and Portugal have important deposits of iron ore, but the latter is unexplored, in the main. The Spanish ore is characteristically high-grade hematite. Much of this ore is convenient to sea-ports, and is shipped abroad, notably to Britain. Coal is available conveniently and in abundance ,and Spain's iron and steel industry is growing rapidly.

Though iron ore is known to be abundant and of wide-spread occurrence throughout the continent of Africa, it has been worked to any extent only in Algeria, whence considerably amounts are shipped to smelters in France.

In concluding these notices of the admirable series of volumes published by the Imperial Mineral Resources Bureau, we have only one suggestion to make. It is that, at slight additional expense, a competent draftsman could be employed to make maps to illustrate future reports that would be more in keeping with the high quality of the text.

The statistics of the mineral output of India during 1921 show the same steady increase that has been been manifested for a number of years past. Modern mining and metallurgical methods have been adopted but slowly there, and only recently has there been systematic exploration and prospecting with a view to discovering and developing mineral deposits. Part of the mineral production for 1921 is as follows:

	1920 Tons	1921 Tons
Coal	17,962,214	19,302,974
Iron ore	558,005	912,084
Manganese ore	736,439	679,286
Tungsten ore	2,310	898
Chromite	26,801	34,762
Magnesite	14,090	20,017
Tin ore	2,117	1,701
Copper ore	28,167	23,089
Bauxite	3,931	1,653

It will be noticed that, apart from coal, iron and manganese, the mineral industry of India is only fairly begun.

There is at present marked activity in the development of hydro-electric power in France, there being now over 2,000,000 h. p. in use. Most of this power is used for the purposes of electrometallurgy and electrochemistry.

England is actively engaged in providing for a nickle currency. The forthcoming budget is to provide funds for suitable machinery, and some 50,000,000 nickle coins are said to have been acquired in England and Denmark.

The Mining Districts

BY THE JOURNAL'S CORRESPONDENTS

GOUDREAU, ONTARIO

GOUDREAU GOLD MINES.— Work on the Murphy claims, near Goudreau, Michipicoten district, continues, though only one shift is working at present. It has not been divulged by the management whether or not mining is to continue during the winter. The surface steam pipes have not yet been covered as a protection against winter weather. The recent connection underground at the 200-foot level between the two shafts was a good one, coming within four feet in elevation and five feet laterally. It has not been made public what value or quantity of gold ore has been disclosed by these operations.

LOCHALSH.— A road has been cut from the railway to the Lochalsh property, in the angle made by the intersection of the Canadian Pacific Railway and the Algoma Central Railway at Franz, north of Lake Superior. There has been disclosed by stripping during the past season some promising gold veins on this property, and it has been taken over by a syndicate of Detroit men. All is now ready for a campaign of diamond-drilling, but this has not yet been commenced.

CLAIMS OPTIONED.— Mr. Webb, an English mining engineer representing substantial British interests, recently made a tour of the Goudreau gold area, and took options on a number of claims of some promise. No work is being done on these claims at present.

BRITISH COLUMBIA

DISCUSSION ON COAL AT INSTITUTE MEETING.— Coal Mining occupied the attention of those who attended the Annual Western Meeting of the Canadian Institute of Mining and Metallurgy held in Vancouver, B. C. from the 15th to the 17th of this month, for only one day. On the morning of Friday, the 17th inst. four papers were presented having a bearing on the industry, namely, *The Complete Gasification of Coal and its Bearing on the National Fuel Problem by* John Keillor, Vancouver, B. C.; *The Development of the Coal Industry in Canada* by F. W. Gray, Montreal; *The Coal Resources of Southern Vancouver Island* by J. D. MacKenzie, Vancouver, B. C.; and *Progressive Coal Mining* by George A. McHattie, Vancouver, B. C.

Many of the delegates took advantage of the opportunity afforded them to visit the coal mines of Vancouver Island in the afternoon, an excursion having been arranged for the two-hour steamer run across the Gulf. In Nanaimo the party was taken through No. 1 Mine, Canadian Western Fuel Corporation and in the evening another interesting business session took place. At this, a paper was presented by J. A. Richards, District Inspector of Mines, Edmonton, Alta. on the *Coal Mining Industry of Alberta.* It was followed by a paper entietled *Some Interesting Features of Modern Coal Mines* by R. R. Wilson of Victoria, B. C.

Thomas Graham, Superintendent of the Canadian Collieries (Dunsmuir's) Limited, referred in congratulatory terms to Mr. Richards' address. He had listened with great interest to his account of the progress the industry was making in the Province of Alberta. Within the next twenty-five years, he predicted, this Province would be the largest coal producer in the British Empire. Mr. Graham said that he had dug coal there in 1888 and that the advances made since that time were equalled nowhere else in Canada.

The recognition of certificates of mine official granted in one province, in all the other provinces of Canada was advocated. It was argued that if such an agreement could be reached Canadian Certificates would carry much more weight outside the Dominion than is now the case. A committee was appointed to fully investigate and report on the matter.

P. G. E. EXTENSION TO PEACE RIVER.— The Pacific Great Eastern Railway, now under construction, soon will have reached its present objective, the town of Prince George. This will give that northern interior community connection with tidewater at Squamish, Howe Sound, some miles north of the city of Vancouver. As the railway creeps further into the interior, attention becomes more and more focused upon the Peace River Country and its resources. It is suggested that the Provincial Government, in its effort to provide adequate business for the line, will be induced to extend it into that rich and little developed region.

That part of the Peace River Country which is within British Columbia has wonderful agricultural possibilities, is believed to contain oil, and is known to possess coal deposits that are likely with development to prove of great economic value.

In the year 1912, an extended report on the Coal Fields of the Peace River was made by C. F. J. Galloway for the B. C. Department of Mines. D. B. Dowling of the Canadian Geological Survey, in reports issued in the year 1915, also mentioned the Coal Fields of the Peace River.

Mr. Galloway stated that the coal-bearing formation extends along the river from near Parle Pas Rapids to Hudson Hope, or a distance of about fifty miles. Coal also is found on the South Pine and North Pine Rivers, so that the possible area of coal formation amounts to to several hundred square miles. Mr. Galloway says, "It would be obviously impossible to form any estimate of the area actually underlain by coal measures without exploring a very considerable amount of territory."

Discussing the coal seams he saw, Mr. Galloway states that thirty-four were noted along the Peace River Canyon and on Gothing Creek, but that the majority were too small to be of commercial value. It is asserted that there are only five outcrops yet known in which the thickness is greater than three feet. These five vary in thickness from three feet to three feet eleven inches, and in most of them the coal is split up by narrow stringers of shale. Regarding the possibility of larger seams occuring, Mr. Galloway says, "There is every reason to believe that many more seams exist besides those described, among which there may be a number of larger ones." Larger seams have been reported by various individuals but there is no official verification of these statements.

As to the quality of the coal, it is classified as "high carbon bituminous", an excellent grade of coal and notably low in ash. The analysis of a typical sample shows water, 2 per cent.; vol. comb. matter, 20.2 per cent.; fixed carbon, 72.2 per cent.; ash, 5.6 per cent. Mr. Galloway makes the following comment, "These analyses show the coal to be of very high grade. While not comparable with the best Welsh Admiralty Steam Coal, it is equal to a high grade of steam coal from that field and compares favourably with the West Virginia Coals, being altogether of an exeeptional quality for Western America."

Summing up, Mr. Galloway asserts that the present known seams appear to be somewhat small for economie mining. The field, however, is large and is unexplored exeept along the rivers. As it is quite undeveloped, there is a reasonable probability that commercial sized seams will yet be found. The field is a potential asset of considerable importance.

Groundhog Coal Field.—Another undeveloped British Columbia coal field is that known as "The Groundhog", situated on the headwaters of the Skeena, Stikine and Nass rivers and lying partly in the Stikine, Skeena and Omineca Mining Divisions. The shortest route to it at present is by pack-trail from Hazelton, on the Grand Trunk Pacific Ry., a distance of 140 miles. Three railway routes to the district have been considered at various times and they vary from 125 to 200 miles in length.

Wm. Fleet Robertson, Provincial Mineralogist, reported on the field in 1912; G. S. Malloch, of the Geological Survey of Canada, made a detailed examination of the same in 1911 and 1912; and there also are reports by James McEvoy, George Watkins and others.

The coal bearing formation, as far as at present indicated by prospecting, covers an area extending about 50 miles in a north-westerly and south-easterly direction, with a width of about 30 miles. Over a large portion of this area the present of coal has been shown by prospecting, but serious attempt at development has been made only in the southern end of the field, where the early discoveries were made. This exploration, as it happens, has been done where the seams are most severely crumpled, folded and eroded. There has been nothing beyond handwork, consisting of tunnelling and shallow inclines. It is believed that diamond drilling will prove better seams than any that yet have had attention. At one time some 600 square miles of coal leases were held in this field but since then have reverted to the government.

Of the many seams located a number have been more or less prospected by tunnelling. They vary in thickness from 3 to 8 feet, with possibly some thicker, and are composed of layers of coal and shale. These layers of coal vary from 6 to 24 inches in theikness, while the shale partings vary from $\frac{1}{4}$ to 4 inches in thickness. Many of the seams, as stated, are twisted and crumpled, with poor roof and floor for mining, but there are a number in which the conditions are good for commercial mining. Speaking generally there are many seams in the field which are large enough to admit of easy mining. Without more reliable and extensive development no reliable estimate can be made as to tonnage.

As to quality the seams exposed are rather "dirty" and will run high in ash. A considerable part of the coal carries a high percentage of shale which it will be difficult to remove by washing. Then, too, what has been developed has been found much shattered and the cleavage planes are filled with foreign matter, such as quartz, calcite etc. It is to be remem-

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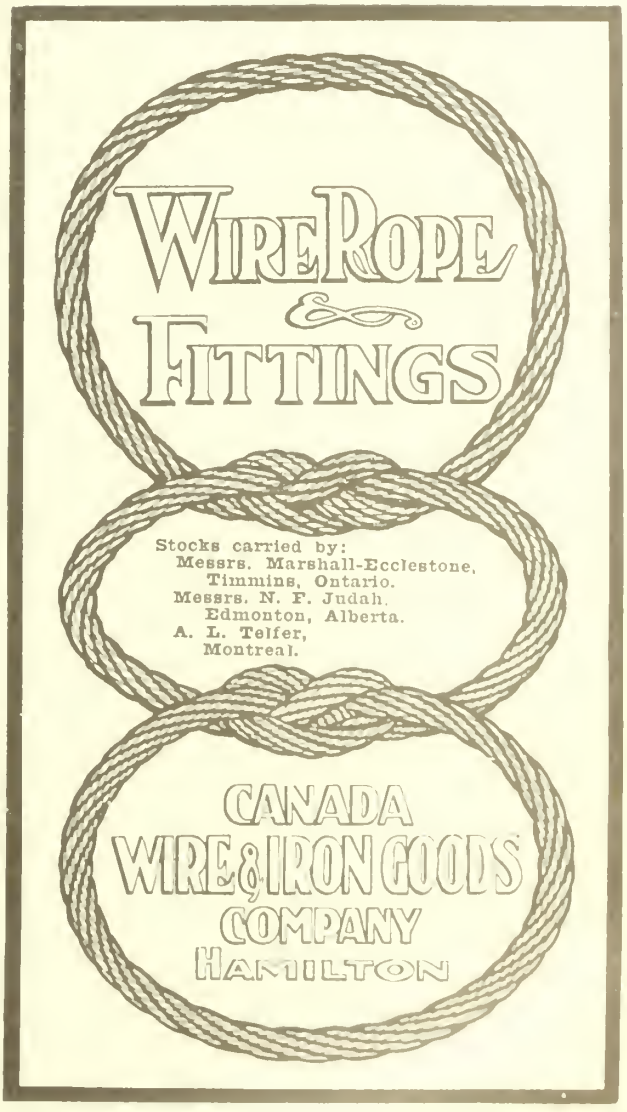

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bered that these observations have to do with the seams on which development, little as it is, has been done.

The coal of the field has been classified as anthracite, although some of it is more nearly described as semi-anthracite. It is an excellent coal. Some samples, however, run high in ash, and others go as low as from 5 to 10 per cent. in ash. One report by a reliable authority places the ash content at about 6 per cent. These are very promising seams. This is a splendid domestic fuel and no doubt would be able to successfully compete for the markets of the Prairies and northern British Columbia. Prospecting on a large scale by diamond drilling, however, is necessary to demonstrate the commercial possibilities of the field because little or nothing is known as yet regarding the undisturbed portions of the field.

Coal Measures on Copper River.— There are promising coal measures on Copper River, some forty miles from Telkwa, Grand Trunk Pacific Ry., a considerable portion of which is controlled by the National Finance Co., Vancouver, in liquidation, through the administrators, the Yorshire Canadian Trust Co., of the same City. There has been some exploratory work done here during the past summer, three or four diamond-drill holes having been sunk. The results of this work have not been announced but are understood to have been satisfactory.

Miners Advocate Amendment to Act.— A deputation of coal miners, representative of the coal mining district of Nanaimo and Ladysmith, Vancouver Island, recently interviewed Hon. A. M. Manson, Attorney General, and Hon. Wm. Sloan, Minister of Mines, seeking an amendment to the Workmen's Compensation Act making the disease Nystagmus compensable under the Act. The miners maintain that Nystagmus is prevalent among the coal miners of this Province, that there have been instances where those afflicted have been unable to continue work, and that there are many slightly affected without realizing their trouble. They argue that it is simple justice to give those so suffering the benefits of protection afforded by the legislation in question. The Ministers promised that their petition would be given every consideration.

Mine Accidents.— There have been a number of minor accidents in the coal mines of Vanvouver Island during the past few weeks. A miner was suffocated in the Cassidy Mine, Granby Consolidated Mining & Smelting Co., when he entered a "fenced off" place. Two men were killed, one being a fire-boss, in the Wakesiah Mine, Western Fuel Corporation of Canada, by a small explosion, practically no injury being done to the mine. These followed in the wake of other accidents in which men either lost their lives or were injured. Mr. George Wilkinson, former Chief Inspector of Mines, has been given a special commission to make the fullest inquiry into each of these occurrences.

Good Coal in Nicola-Princeton Field.— The Carbondale Coal Co. is making satisfactory progress in the development of its holdings in the Nicola-Princeton field. A shaft has been sunk one hundred feet and the seam is being opened up to permit the use of a shearing machine. The coal already has found a market in Princeton and adjacent communities and is said to make an excellent domestic fuel.

It has been demonstrated by exploration that a considerable quantity of cassiterite is available in alluvial deposits in the Katanga district of Belgian Congo, which has become prominent lately as a producer of copper. An appreciable amount of tinstone has already been recovered and shipped.

INDEX TO MINE AND MILL SUPPLIES

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EDITORIAL

I am in hopes that in the peat bogs of Ontario and Quebec and other portions of Canada, we have what will yet be a most important asset.
Thos. W. Gibson—1904

MILLIONS OF TONS OF PEAT FUEL NOW AVAILABLE

The coal statistics of Canada for August, issued last week by the Dominion Bureau of Statities, are a vivid reminder of the salient fact of Canada's fuel problem. In spite of the interference with output due to the strikes in Alberta and Nova Scotia, the cumulative production throughout Canada for the first eight months of the year was 7,745,000 tons, as against 9,319,000 tons average for a similar period in the three preceding years.

During August, 29,000 tons of anthracite, 6 per cent. of the usual amount for that month, was imported. Bituminous coal to the extent of 364,000 tons, or 21 per cent. of the normal amount, was brought in, 305,000 tons of it into Ontario and 50,000 tons into Quebec. The scarcity of fuel indicated by these figures would not now be alleviated as much as it is, were it not for the fact that the railways of the United States that bring coal to Canada control also some of the coal mines, and have taken care to get promptly the extra profit due to the long haul to our borders.

Most of the householders in urban communities throughout Ontario and the western part of Quebec must realize clearly now, their present utter dependence upon coal produced in a foreign country. Consequently now, as never before, there is an opportunity to introduce the use of Canadian fuel wherever it is commercially feasible. The new fuel committee in Ottawa has a shrewd eye to this opportunity and will, no doubt, take full advantage of it.

Today we wish to point out a resource in fuel that now seems to be, for the first time, available for commercial use in Canada. Elsewhere in this issue there is a description of the resources of potential peat fuel contained in the comparatively few peat bogs that have been surveyed up to the present. There are literally millions of tons of fuel available within reach of almost every large centre of population in Ontario and Quebec, while the supply of the smaller communities from this source is assured for an indefinite period. Luckily, the further north one goes from the Pennsylvania coal fields, the more peat there is available, though few of the bogs have been surveyed as yet in the northern parts.

The work of the Joint Peat Committee of the governments at Toronto and Ottawa during the past four years has resulted in the invention of mechanisms, in the main automatic, that will turn raw peat into a first-rate fuel at such low cost that the process is almost certainly capable of commercial application. Due to motives of economy, the central part of the machinery used during the season of 1922 at the Alfred bog was not renewed to include the advances in design indicated as expedient during the previous season. As a result of this, and of further improvements in design indicated during the season just closed, it has been shown that much greater economy of operation than that actually accomplished can be reached with a new plant. Nevertheless the experiment has been, on the whole, very successful. During the four seasons of experiment, there has been developed effective machinery much more complicated than the steam locomotive, which has reached its present state of effectiveness only after a century of continuous effort. The development of the Anrep-Moore machine peat manufacturing plant will, no doubt, be continued until it is even more effective than at present.

The immediate problem that confronts those interested in peat is how to ensure the continuance of the good work. The Ontario government has withdrawn its support, deeming the present results sufficient to warrant private capital investing in a commercial peat manufacturing plant. This private investment is not yet assured. Meantime the Prime Minister of Quebec has intimated publicly that his government has now an active interest in peat. As Quebec has not yet contributed its share to this common cause, the present time might prove most opportune and effective for financial aid that would be of comparatively slight dimensions compared with the sums already contributed.

The peat experiments have met with such a marked degree of practical success that there is now warranted a thoroughgoing commercial trial of the process. Whether this should be financed from public funds or should be undertaken privately, we are not prepared to say. But it would be calamitous were ultimate success jeopardised by a discontinuance of the present annual progress. Such a mistake was made 14 years ago, when a change of government interrupted the progress of a promising investigation into the use of

peat, which is only now being brought to fruition after years of lost time. We must have the use of these millions of tons of peat fuel.

TIMIDITY AND TEMERITY

Rejection of a mine or prospect is easier than acceptance for the mining engineer who examines it. His responsibility seems to end when he turns down a property; and to begin only when he reports favorably upon it.

We have often wondered just how far the mining engineer is influenced by this consideration. How often are properties reported upon adversely chiefly because the engineer does not care to assume the responsibility of recommending them? To what extent does sheer lack of moral courage, the fear of risking a reputation, or positive inability to size up the merits of prospects or mines, limit the usefulness of examining engineers? We shall not attempt to answer that question. But there is something to be said regarding the fact that mining engineers, as a class, have acquired the reputation of being less willing to recommend than to damn a mining property. It is a matter of personal opinion as to whether this is or is not fair to the engineer. But there can be no question of the fact that the reputation sticks. Prospectors and investors make the same complaint.

There is a very simple corrective which, once applied, will protect the engineer from injustice. If, in all instances when mining properties are examined for purchase or sale, the examining engineer were to make a straight-forward, complete, and readable report to his employers, a report containing a resumé of his reasons for or against purchase, couched in language that the layman can understand, then almost all the difficulties that surround such work would be removed.

We are moved to write thus by reason of the fact that we have read, with pain, some dozens of reports that might mean anything and generally meant nothing, or else presented conclusions without adducing adequate reasons.

Putting it by and large, the average mining report is not a document of which to be proud. It usually lacks precision of diction altogether. It dwells on non-essentials. It conveys no meaning to the layman. It neither satisfies the business man nor convinces the technical man. The very cloudiness of its meaning is taken as symptomatic of timidity on the part of the engineer.

The man who sets forth his opinions, or his convictions, in positive terms is to be preferred to him who hides his meaning under a cloud of words.

Moreover, an engineer's responsibility does not always end when he reports adversely on prospect or mine. His action, if ill-considered, may do irreparable hurt to a new camp. It may work a gross injustice upon a deserving enterprise. A man should be very sure of his ground before he exercises this, the most important of his professional functions.

FELDSPAR FOR GREAT BRITAIN

The results of special investigations conducted by Mr. H. S. Spence in Great Britain seem to indicate that there is not much chance for developing a market for Canadian feldspar in the old country. As reported in the press, Mr. Spence bases his discouraging statements upon the costs of rail and ocean transportation as against the comparatively low price obtainable for crude feldspar in Great Britain, as well as upon the prevalent use there of "Cornish stone" instead of feldspar, this stone being a natural mixture of feldspar, China clay and quartz. In this he is patently right.

However, we would like to learn Mr. Spence's opinion of the commercial practicability of selling ground and carefully graded Canadian feldspar in the English market. Frankly, we do not think that any reasonable person would contemplate shipping crude feldspar across the Atlantic. Hence Mr. Spence's reported opinion has no particular bearing on the case. Also, his quoted statement, to the effect that the annual consumption of feldspar in England by all trades amounts to but five thousand tons, is obviously a statement only of present conditions, and ignores the possibility of modifying these conditions. It is quite possible that the use of Canadian feldspar might be a decided advantage to English potters.

We invite, therefore, a full and authoritative pronouncement on the possibilities of developing an overseas trade in prepared feldspar. Information from private sources leads us to believe that Mr. Spence may be taking too gloomy a view of the situation. However, as Mr. Spence is an experienced and competent official, it is more likely that his commission in making this investigation and report did not include a study of possible future developments dependent upon such private initiative as would be required to put Canadian feldspar on the British market.

PROSPECTIVE GUSHERS FOR ONTARIO!

We have before us a prospectus and a booklet from an oil company that are of unusual interest. In the first place they do not come from Fort Worth, Texas —that prolific source of oil promotion whose output (of circulars) has inundated the Canadian mails of late. No — this is a home-grown, Canadian product— strictly Made-in-Canada.

The booklet discloses some very interesting information. In prehistoric times a Great Arctic Oil River meandered down through North America from Mackenzie River to the Gulf of Mexico. Where lake expansions occurred on its serpentine course, there now

are great basins of oil. One of the greatest of these lakes lies conveniently located beneath Mariposa township, near Peterborough, Ontario. Here (we are told by the anonymous author of this interesting document, who claims exclusive scientific knowledge in the matter) lies untold liquid wealth. Some enterprising citizens of Peterborough have, therefore, incorporated the Central Ontario Oilfields, Limited, and are offering stock for sale for the purely nominal price of $2 a share.

We have no more space to quote the startling scientific information included in these interesting documents. We fail to notice, however, that the necessary statutory information has been included, and wonder if these magnanimous members of the directorate of Central Ontario Oilfields, Limited, are liable to action under the existing laws. It will be a pity if they are not. Provincial Secretary, please take notice.

BAUXITE, FELDSPAR AND ALUMINIUM

On another page Mr. Kirby Thomas describes briefly a deposit of bauxite, of unusual dimensions and purity, that has been developed in British Guiana by American capital. It is good news that a British colony contains what is now proved to be one of the best available sources of aluminium ore, and it is satisfactory to have it developed. It is a pity, though, that Britishers are not to reap the full benefit of its possession.

The United States is at present the world's principal producer of aluminium. She has assumed this leading position by virtue of cheap hydro-electric power and bauxite deposits, conveniently located in the southern states, principally in Arkansas. During 1921, 140,000 tons of bauxite was mined and 20,000 tons of the metal, worth $11,000,000, produced in the United States these totals being only one-half to one-quarter of the totals of the years immediately preceding. The exhaustion of the best deposits available in the United States has induced the aluminium manufacturers of the United States (virtually one corporation) to look for supplies elsewhere; hence their activity in British Guiana.

Canada has more, and cheaper, hydro-electric power than the United States, and it is, in general, more conveniently located. Already there is a large amount of aluminium made in Canada, and the amount is bound to increase very rapidly. At present the material for this is brought from St. Louis as refined alumina, the bauxite having been treated there. If any considerable part of the alumina to be used in Canada should originate in British Guiana, this route to, say, Shawinigan Falls via St. Louis will be roundabout. It will be more logical, and possibly more economical, to refine the bauxite in Canada.

During the past week definite announcement has been made in the Quebec legislature of the development of the huge water-power at the Grande Decharge, where the Saguenay River issues from Lake St. John. The problem will be to make effective use of this power. One wonders whether part of the plan may not include a new aluminium plant, to use alumina refined in Canada from British Guiana bauxite. This would prove a very acceptable addition to Canada's metallurgical equipment, until such time as our own resources in alumina, still securely locked up in our vast deposits of feldspar, shall have been made available through the researcher's art, and a completely indigenous aluminium industry thus established.

EDITORIAL NOTES

The destruction by fire of the East Broughton mill of Asbestos Mines, Limited, is unfortunate at this time. This mill produced the short fibre characteristic of the East Broughton area, for which there is at present a very active demand. The Company's mill at Black Lake produces mainly high-grade fibre, for which an active demand is only commencing again. The management of this company is, however, very energetic and in an unusually strong financial position so that whatever may be the insurance on the old plant (this has not yet been publicly announced), it is certain that Quebec's asbestos industry will not long lack the support of this important producer.

General Smart has advocated publicly in the Quebec legislature the use of peat as fuel, as well as its use for the production of coke, oil and gas by distillation. This is good news. It is also very satisfactory to know that the Quebec government is ready to pay a royalty on the production of peat fuel. Hon. M. Perrault's rather pessimistic remarks, coupled with this announcement, can be discounted in view of the known success to date of the experiments at Alfred, Ontario.

In commenting recently on progress at the Pancake Lake property of the Crown Reserve Mining Company, we stated, erroneously, that Mr. Harry Ke[illegible] charge. It is Mr. H. J. Stewart who is conducting the operations on this property.

PEAT

Viewsstude was surely middle name,
O, fibrous fuel!
Long, very long, last thou had nought to claim
And treatment cruel!
But now the people who have hard[illegible]
Into their coal bins eagerly have pounced thee,
And in their furnaces with vigour [illegible]
Thou moss-born jewel!

ANON.

Editor's Note: Peat [illegible] is significant that it is now [illegible] a study. It is more significant that one hired girl has [illegible] as a subject for his dithyrambs. He [illegible] popular acclaim, he [illegible] the crowd.

The 1922 Peat Experiments

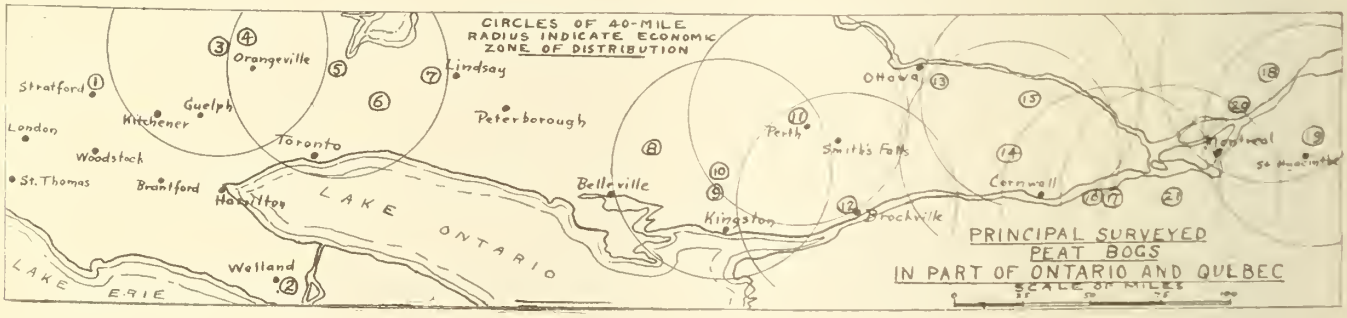
SOME RESULTS FROM OPERATIONS AT THE PEAT BOG AT ALFRED, ONTARIO

Few Canadians realize the extent and the potential value of the fuel now lying unused in the peat bogs that lie scattered from coast to coast. It is not likely that these will be put to use within a measurable space of time in those parts of the Dominion where Canadian coal is available; but in Ontario and in the western part of Quebec, which are dependent at present on imported fuel, the possible utility of the peat bogs may well be examined with the greatest care.

During the past season two articles in the *Canadian Mining Journal* have dealt with the manufacture of peat. The first, on March 31st, discussed the relation of peat to the other fuels, with the conclusion that it is at present useful primarily as a domestic fuel, and a very good one at that. On August 4th a description was given of the experimental operations conducted during the summer on the bog at Alfred, Ontario, which have resulted in the manufacture of 5,000 tons of excellent fuel. The present article will give some results observed during the work of the past season, and deductions that bear on the commercial application of the Anrep-Moore Machine Peat Manufacturing Plant. But first it will be well to examine briefly the extent of the natural resource it is hoped to put to use by this means.

Surveyed Peat Bogs

Since 1908, when at the instance of Dr. Eugene Haanel, the Mines Branch, Ottawa, first undertook the investigation of peat as a source of fuel, a peat expert has been employed each summer to examine the bogs available. Those near large centres of fuel consumption, and near a railway as well, have been examined first. The plan and table below give data regarding a number of these, selected from among those surveyed because of their favourable location. A railway already crosses or touches most of these, and all are within reach of cities and towns that are now importing coal to the extent of millions of tons annually, in the aggregate, a large part of which could be replaced by peat fuel. The surveying of peat bogs has been merely commenced, and when those that are at present less accessible or remote from large centres of population shall have been surveyed, the total will be a vast amount, comparable with the coal beds that are now being drawn upon to provide us with fuel. Seven bogs now surveyed within a convenient distance of Toronto are capable of producing 26,500,000 tons of fuel. Seven bogs in the Montreal district could furnish 23,500,000 tons of fuel.



No. on Plan	Name of Bog	Location	Fuel Available Tons as prep.	Calorific Val. B.T.U. per lb
1.	Brunner	1 mile from Victoria Road, Station G. T. R.	1,172,000	8,850
2.	Welland	6 miles from Welland, on Welland Canal.	4,106,000	8,667
3.	Luther	2½ miles from C.P.R., near Grand Valley, Dufferin County.	7,443,000	8,364
4.	Amaranth	4 miles from Crombie Station, Dufferin County.	264,000	8,710
5.	Holland	6 miles from Newmarket, on G. T. R.	8,219,000	8,510
6.	Marsh Hill	1 mile east of Uxbridge, on G. T. R.	9,620,000	8,068
7.	Manilla	2 miles from Mariposa Station, Ontario County, and ½ mile from G. T. R.	399,000	8,100
8.	Stoco	½ mile from Stoco Sta., C.N.R., Hastings County.	1,345,000	7,557
9.	Harrowsmith	On C.N.R. and C.P.R., Frontenac County.	396,000	. . .
10.	Verona	On C.N.R. and C.P.R., Frontenac County.	10,636,000	. . .
11.	Perth	1½ miles from Perth, on C.P.R.	5,126,000	9,148
12.	Brockville	3 miles from Brockville, on C.P.R.	1,694,000	8,173
13.	Mer Bleue	8 miles from Ottawa on C.P.R. and G.T.R.	5,125,000	9,126
14.	Newington	At Newington Station, on N. Y. C. Ry.	6,208,000	8,465
15.	Alfred	At Alfred Station, on C. P. R.	9,369,000	8,730
16.	Large Tea Field	On St. Lawrence River and G.T.R. near Valleyfield.	4,824,000	9,400
17.	Small Tea Field	On St. Lawrence River and G.T.R. near Valleyfield.	3,315,000	9,200
18.	Lanoraie	On C.P.R. at Lanoraie Sta., 40 miles from Montreal.	4,751,000	8,967
19.	St. Hyacinthe	On C.P.R. 2 miles from St. Hyacinthe Station.	3,666,000	8,850
20.	L'Assomption	2 miles from L'Epiphanie Sta., L'Assomption County.	1,760,000	9,700
21.	St. Isidore	3 miles south of St. Isidore Station.	2,242,000	8,900

A Commercial Method now Available

The question is, how to put to commercial use these stores of potential fuel. Air-dried peat is used in country districts in Ireland and Scotland and on the Continent; but no one would use such an inferior fuel in Canada. Machine peat is made successfully in Sweden and Germany; but the processes of manufacture in use there are much too costly for successful use in Canada. The experimental work of the Joint Peat Committee during the past four years has provided the answer to the question. The Anrep-Moore Machine Peat Manufacturing Plant, developed slowly, bit by bit, during these four years, is now capable of making fuel at a cost that will allow it to compete with coal, if one can judge by the actual results and logical deductions from these results.

The evolution of the various elements of this plant has been an extremely interesting process to watch. The principle used in excavating was laid down first by the late Mr. S. Anrep of Helsingburg, Sweden, whose son, Mr. A. Anrep has worked on the peat surveying for the Department of Mines, Ottawa for a number of years. Mr. E. V. Moore, engineer for the Joint Peat Committee, adapted Mr. Anrep's idea to practical use. The remaining two essentials in preparing the raw peat are first, maceration, to break down the cell walls and so let the water run away and evaporate, and second, spreading the resulting pulp on the bog. After trying out a number of specially designed macerators, Mr. Moore has found that a standard swing hammer mill serves the purpose best of all. For spreading the peat on the bog there has been devised a simple and very clever bit of mechanism that has been described briefly in a former article. Additional ingenuity has been required to construct a number of additional mechanisms to aid in harvesting and stock-piling the dried peat and loading it into railway cars.

Cost of Production, 1922

During periods of normal operation in the season of 1922 (including a reasonable percentage of lost time) observation shows the production cost per ton of fuel made was about $3.50 made up approximately as follows:

Raw material (royalty)	$ .05
Power	1.10
Labour, oil and repairs for manufacturing	.65
Tarding and cubing	.25
Harvesting	1.10
Clearing and draining bog	.05
Miscellaneous charges	.30
	$3.50

Power was derived from peat, and this has been charged up at the rate it was sold to the public—$5.00 a ton. The labour charge includes the crew necessary to operate the machinery and keep it in order, and competent supervision of the mechanical operation. The turning of the blocks of half dried peat to expose the under side is done best by hand, and at the same time peat that lies in a depression that has retarded drying is piled in open heaps (cubing). The harvesting includes loading the dry peat by hand on a travelling belt that delivers it into 1½ ton cars, the laying of the narrow gauge tracks on which these cars run, hauling to the railway, stock piling, and loading into railway cars. The time lost in turning round the whole apparatus when it reaches the end of the long excavation, in preparation for the return trip along the other side, is included.

To this operating charge must be added a charge for overhead expenses. The replacement cost of the whole plant (which would manufacture 20,000 tons of fuel during the season of 100 days if worked 20 hours a day) is approximately $90,000. A fair charge for depreciation and interest is 20 per cent. per annum, which is $18,000. The annual turn-over (20,000 tons at $5.00) is $100,000; a charge of 10 per cent. against this for administration and office expense will cover its cost amply—$10,000 a year. This makes a total overhead expense of $28,000 a year, or $1.40 a ton. Add to this the manufacturing cost of $3.50 a ton and the total expense is $4.90 a ton. Thus the plant in use during the season of 1922, imperfect though it is, has about cleared expenses selling at $5.00 a ton. It must be borne in mind, of course, that only the charges to which a commercial operation would be put are included in this total; the cost of the experimental work itself is a separate item.

Alterations to Effect Economies

As mentioned above, the plant at Alfred has been developed, bit by bit, during the progress of four years of experimental work. Thus it is, inevitably, far from perfect in its construction as every experimental plant must be. However, the spreading, harvesting, storage and loading equipment, are in sufficiently good shape to warrant their inclusion in an operating commercial plant. A larger size of macerator will be required and two other parts need complete replacement—the excavator and the main power unit. The excavator was pieced together from pre-existing experimental machines, and has passed its usefulness. The steam plant at present in use does not deliver enough power, is weighty and cumbrous, and can best be replaced by electric motors driven from a separate generator unit. With the addition of these new items and minor alterations in the rest of the apparatus, the Anrep Moore Machine Peat Manufacturing Plant now at Alfred promises to make fuel on a commercial basis.

This suggested alteration of the existing plant would effect very considerable economies in the present cost. The present charge of $1.10 per ton for power, for instance, would be cut to about 26 cents per ton, as follows:

Cost of Steam Power, Season of 1922

Fuel, 9 1/3 tons at $5.00	$46.67
Labour, 1 men	17.00
Gasoline	3.80
Oil and supplies	5.50
Repairs	5.00
Total, 100 to 7 tons	$82.97
or, per ton, say	$ 1.10

(Note—Average capacity 100 tons per 10 hours.)

Diesel Engine, Electric Generator (Motor Compressed Plant)

Fuel (100 gallons)	$ [illegible]
Labour, 1 man	[illegible]
Oil and Supplies	[illegible]
Repairs	[illegible]
Total, for 100 tons (one shift)	$20.00
or, per ton	$ 0.20

Again, a slight change in the harvesting mechanism will reduce the cost from $1.10 per ton to 85 cents. With the mechanism brought up to date in these particulars, it is confidently expected that the costs will fall within the following limits:

Raw material (royalty) (as before)	$ .05
Power (Diesel)	.26
Labour, oil and repairs (for manufacturing)	.30
Turning and cubing (as before)	.25
Harvesting	.85
Moving round ends of excavation	.10
Clearing and draining bog (as before)	.05
Miscellaneous charges	.14
	$2.00
Overhead charges (as before)	$1.40
Total cost, per ton	$3.40

Thus it is probable that the cost of production, which was $4.90 this year, can be reduced to $3.40 per ton or less by effecting the changes in the mechanisms that the experimental work of 1922 has shown to be expedient. These changes are not radical or dependent upon experiment, nor do they make the replacement charge of the plant greater than at present. What they will do is to make possible a reasonable profit, say $1.50 a ton, in the manufacture of the peat fuel when sold at $5.00 a ton at the bog.

Quality of the 1922 *Peat Crop*

Never before has machine peat been made in Canada to equal that produced at the bog in Alfred during the experiments of the past summer. In spite of the vicissitudes that are bound to accompany experimental work, the 5,000 tons of peat fuel produced and sold was of a uniformly high quality. It found a ready sale as far west as Peterborough and Toronto, as far north as Liskeard, and as far east as Montreal. There are now several hundreds of householders convinced, from practical trial, that machine peat is an ideal fuel for cook-stoves and open grates, and that it can usefully replace the more expensive anthracite fuel in the furnace in mild autumn weather. If the Peat Committee had manufactured several times the amount of peat made available from the experiments, it would have found a ready sale.

* * *

Throughout the four years of the Joint Peat Committee's investigations, the Committee and their engineers have laboured most faithfully to accomplish their end. They have been hampered by the inherent disabilities of governmental control and direction, and especially by the uncertainty, from year to year, of a continuance of the vote of money to carry on their work. That they have carried on the work in spite of difficulty and discouragement speaks volumes for their determination and persistence. That they have now brought in sight the goal they set out for originally, is a tribute to their mechanical ability and ingenuity as well as to their perseverance and their faith in the ultimate outcome. The path of the pioneer in any line is a rugged one, and his reward is not always sure. The work instituted by Dr. Haanel years ago and his persistent efforts since then on behalf of a peat industry have been ably continued by engineers of the next generation. The Peat Committee and its staff have earned the hearty thanks of Canadians in general, and they deserve continued encouragement and financial support, if not from public, then from private sources.

NEW MAPS READY

The Ontario Department of Mines has already off the press one of its 1922 geological maps of Northern Ontario—a most expeditious performance, and well worthy of this most excellently managed public department. This map sheet, the *Blanche River Area,* is five townships (30 miles) square and extends from the northern end of Lake Temiskaming up to the townships of Catherine and Skead, and from the interprovincial boundary westward to the townships of Tudhope and Truax, which are included in the Elk Lake-Montreal River sheet of 1907. The Boston-Skead area to the north was mapped in detail in 1921 and described by Messrs. Burrows and Hopkins in their recent report. The new map thus fills in the gap between the Cobalt sheet and the most southerly of the gold areas. It will accompany a report by Messrs. Burrows and Hopkins in Volume 31, Part 3, 1922.

The Blanche River area is covered mainly by the subsidiary clay belt that extends southward as far as New Liskeard. The roads, post-offices and schools shown on the map indicate the extensive settlement of this fertile land that has been induced by the presence of the railway and of the surrounding mining communities. Only derelict mining camps are to be found within the area itself —Casey, Wedigo, Cane and Triangle.

With the mapping of this area, and of some townships to the north that will be included in the forthcoming Kirkland map, there now remain few blank spaces in the general geological map from the Canadian Pacific main line northward to the Transcontinental Railway over a width of a hundred miles westward from the interprovincial boundary. The work of mapping in detail this area of close on 18,000 square miles has been divided between the Ontario Department of Mines and the Geological Survey at Ottawa. It represents a huge task, and it has been well done. A new map on the scale of six miles to the inch to replace that published in 1913, is projected for the near future.

MONTREAL BRANCH MEETING OF INSTITUTE

The Montreal Branch of the Canadian Institute of Mining and Metallurgy met in the Windsor Hotel, Montreal, on December 8th, to hear an address, illustrated by moving picture, on the new "road-rail" method of transport by Mr. Herbert Kennedy, and to make nominations for the 1923 election of officers for the Institute. Mr. John Dresser was duly nominated for the presidency, and Prof. J. W. Bell and Mr. T. C. Denis as councillors. The secretary was directed to forward a request to the Thetford Branch of the Institute that they make a nomination or nominations for councillor.

Mr. Kennedy described clearly the operation of the "road-rail" transport system, which was developed in central Africa during the war-time, and whose commercial application is sponsored by William Beardmore and Co., the well-known Scottish shipbuilders and engineers. It may well be that this new system will prove useful in opening up Canadian mining camps.

A CORRECTION

A correspondent in Rome draws attention to the fact that in reviewing the Imperial Mineral Resources Bureau's volume on *Quicksilver* recently we stated erroneously that Monte Amiata was formerly in Austria. It is the other mercury-producing district, Idria, that was in Austria.

Letters From Porcupine--V

THE PERSEVERANCE OF THE—SAINTS

Looking back over the slowly unfolding panorama of Porcupine's history affords an interesting study in the survival of the fittest.

To avoid unseemly personalities it is expedient to make one or two composite pictures. Each will be true to life generally and particularly, but none will be distinguishable as the presentment of any one person's career.

* * *

Z., along with a few friends, got hold of a "veteran" claim shortly after the first stir in Porcupine. With some difficulty he financed the purchase of the claim and the formation and flotation of an operating company. The geology of the camp was little understood and a great deal misinterpreted. The vein on which the first shaft was sunk was very spotty, alternately rich and lean. When it was lean it was very lean indeed, and when it was rich it was rich enough to warp anybody's judgment. The lean ore, of course, predominated. Z. had that blind faith in the property that makes a man hold on.

After two re-organizations the company was so hard pressed that control was sold to a group of United States financial men. Meanwhile Z. had been forced to fight two or more commission suits instituted by persons who had no real claim on him whatever.

Z lost the property. Three years of the hardest kind of work had gone for nothing. However, emulating Henley's hero, he refused to bow to the buffetings of fate. Patiently, and with never a thought of surrender, he picked up other properties. Gradually he secured competent backing. In every move he was handicaped by the tactics of parasites who wished to be bought off, and by disparagers who hated to see him succeed—strange freaks of human nature. It took him somewhat over four years to get going. He is arriving.

* * *

Quite different is the story of X., and X. was a radically different person. He was a promotor first, last and always. His intention in securing a Porcupine property was to make it the *raison d'etre* of a stock-jobbing campaign in the course of which he would clean up and get out from under. So far as shareholders were concerned, they could be "damned". Nor did the mine interest him except as an excuse for gonging the public. His intimates were told as much.

X. was in a fair way to accomplish his purpose. Unfortunately for him he was too greedy. He tried to enlarge his haul by multiplying the capitalization of his company. At this stage the newspapers began to criticise him. It became unsafe for him to carry out his plan. So he arranged to have good news sent by wire from the mine at judicious intervals and kept on financing it. Meanwhile, much to his surprise, the mine began to show some ore. But he had already so juggled with the company's shares that outside aid was imperative. His top heavy organization was again remodelled—closer to his heart's desire, so to say. In London he succeeded in loosening the strings of some cornucopian purses. London may have a run for its money; but it will assuredly not be X.'s fault if it does. Yet X.'s kind seem to appeal to the Old Country magnate.

The sporting spirit of Z. is a pleasing contrast to the avariciousness of X. The former played the game straight and could profit only if his associates profited. The latter would, and did, get his slice no matter what happened.

* * *

A third composite portrait is that of Y. who has been operating for some little time and very strictly minding his own business. In developing his mine he is using privately subscribed funds, which are most carefully administered and applied to the development of the mine solely. Y. has sought no publicity and has done no talking—a fact that is resented by sundry inquisitive persons. Here, again, is a side-light on a strange quirk in human psychology.

The plant on Y.'s property is efficient and unpretentious. He is doing his best to make certain of a large reserve of ore before he begins building a mill. He has spent more time in this fundamentally necessary work than X. would require to "put across" a dozen dizzy schemes.

* * *

W. is a vendor of claims. In every mining district of Northern Ontario he has staked claims, done the assesment work, and disposed of some of them at good, fat prices. He knows his way about, and is of the David Harum school of bargainers. In slack times he can turn his hand to many things and make more than a living. Pulpwood and cord-wood contracts are sources of incidental earned increment to him. But his real vocation is selling undeveloped claims.

Probably he would fail lamentably in any attempt to put his geological ideas down on paper. Nevertheless, he thinks clearly and to the point when he is diagnosing new ground. He uses geological maps and needs more of them and more details than he can get from published maps. He is a shrewd, quiet, and enterprising citizen who is a genuine asset to the community. It is this class of man that needs and deserves special attention from the Ontario Department of Mines.

* * *

In closing this very casual series of Letters from Porcupine I wish to emphasize one point. That is, that all investors, or would be investors, in gold mining shares should visit Porcupine. It is eminently worth while for the Canadian business man to see for himself what has been done and what is being done in an industry that is to become the economic stabilizer of the nation.

J. C. MURRAY

The government of New Zealand has undertaken to expend a million pounds a year for the next ten years on the development of hydro-electric power. There is additional power being developed constantly by private capital.

On the property of the Transvaal Silver and Base Metals company, southeast of Pretoria, South Africa, silver-lead occurs in a siderite gangue in diabase intrusive sheets of comparatively recent origin. The ore is desulphurized and smelted in blast furnaces at the mine, and the pig lead shipped to Europe for refining and desilverizing, there being about 100 ounces of silver to the ton of lead.

The Sulphur Industry of the U.S.

By ALBERT G. WOLF, Mining Engineer, Texas Gulf Sulphur Company, Gulf, Texas

The world's consumption of sulphur in the elemental state is greater than is generally realized. In the United States and Canada alone this amounts to three-quarters of a million long tons annually. Practically all of this, over ninety-nine per cent. is supplied by three mines on the Mexican Gulf Coast of the United States. These same mines export annually approximately one-quarter million tons to European countries. These mines are: The Texas Gulf Sulphur Company, Gulf, Matagorda County, Texas; the Union Sulphur Company, Sulphur, Calcasieu Parish, Louisiana; and the Freeport Sulphur Company, Freeport, Brazoria County, Texas.

Sulphur mines, like metal mines, may be classified as high-cost and low-cost producers. Adopting this classification, it can be safety stated that the Texas Gulf Sulphur Company and the Union Sulphur Company are very low-cost producers, whereas the Freeport Sulphur Company is a relatively high-cost producer. All three of these mines, however, are in a low-cost class by themselves as compared with European and Asiatic mines, and the few small-tonnage producers of the United States not mentioned above.

Salt Dome Formations

The coastal sulphur deposits occur in what are known as salt domes. These are true structural domes that are usually, although not always, indicated upon the surface by slight topographic domes in the low, flat coastal plain. These interesting formations are scattered over a belt extending about seventy-five miles inland from the coast and reaching from the Atchafalaya River, in Louisiana, to the Colorado River of Texas. There are fifty or sixty domes, many of them being productive of oil, but to date only four have been found to contain sulphur in commercial quantity.

The structural features of these domes may be divided, for our discussion here, into three parts, the salt core, the cap rock, and the overlying and abutting sediments. Almost all of the sediments are unconsolidated, consisting of gumbo, sands, clays, and beds of marine shells, with lenses of limestone and sandy limestone. The upper strata are of the Quaternary, and the lower of the Tertiary. The deeper strata have been broken through, by the intrusion of the salt core, and bent upward at angles of thirty degrees to almost vertical, and the overlying strata have been gently arched by the upthrust.

The core consists of a mass of rock salt, more or less circular or elliptical in horizontal cross section, with radii varying from one-eight to one mile in different domes. Its top slopes from the center in all directions, gently near the center, and then increasingly steeper, giving the entire core somewhat the shape of a paraboloid slightly flattened at the top. The depth to which a salt core extends has never been determined. Several wells have been drilled two thousand feet in salt, and one case is recorded where a well penetrated three thousand feet of salt without passing through it.

The cap rock consists of anhydrite lying immediately over the salt, and above that, porous limestone and calcite. In this limestone occurs the native sulphur. The depth of the cap below the surface varies from a few feet in some domes to fifteen hundred feet or more in others.

Sulphur Mining

To extract sulphur from these salt-dome deposits there are required a competent drilling and field-operating organization and a boiler plant of large horsepower, together with water superheaters, high pressure pumps, and air compressors.

Holes are sunk to the bottom of the sulphur-bearing formation by the rotary method of oil-well drilling. In these holes four concentric strings of pipe are set. The first is an 8-in. or 10-in. casing to cap rock. Then a 6-in. line is run to the bottom of the sulphur stratum. This string is perforated near the bottom to permit the entrance of molten sulphur. The third pipe is 3-in. in size, and through it the sulphur is raised. Inside the 3-in. is a 1-in. line for compressed air.

Water, heated to about 325 deg. F., and at 100 to 250 lb. pressure, is pumped into the well between the 3-in. and 6-in. pipes, sometimes through the 3-in. also, and occasionally between the 6-in. pipe and the 8-in. casing. The sulphur is melted by the hot water and runs to the bottom of the well from where it is forced part way up the 3-in. pipe by the water pressure. It is raised the rest of the way to the surface by compressed air, under 500-lb. pressure, which is released from the 1-in. pipe near the bottom of the 3-in. pipe. The molten sulphur is then conducted through pipes to storage vats built of lumber. These vats are sometimes built to a height of fifty feet, and when finished contain anywhere from fifty thousand tons to one million tons in a single block. The sulphur is loaded from the vats to railroad cars by locomotive cranes and by car loaders.

The best idea of the mine-water heating plant can be obtained from a concrete example. In this case the plant of the Texas Gulf Sulphur Company is selected because it is the largest and most up-to-date installation. The major units consist of fourteen Stirling water-tube boilers of 702 hp. each, eight mine-water heaters, thirty-four duplex, slide-valve pressure-pumps, and six Laidlaw-Dunn-Gordon compressors. Half of the pumps supply water to the mine-water heaters, and the other half, called the "booster pumps", send the water to the wells under pressures up to 250 lb. when necessary. The boilers supply steam to the mine-water heaters and to the compressors, turbo-generators, and feed-water pumps. The heaters raise the temperature of the mine-water to approximately the temperature of live steam under 95 to 105 lb. pressure, say 325 to 335 deg. F. The plant, when designed, was expected to furnish sufficient hot water to mine one thousand tons of sulphur per day; as a matter of fact, about five times that amount has been mined when desired.

The Discovery of Coastal Sulphur

In 1865 oil seeps were found in Calcasieu Parish, Louisiana, and attempts were made to develop oil. This work led to the discovery of sulphur, in 1869, in what subsequently proved to be a salt dome, although at that time the nature of the deposit was not known. This sulphur deposit is now being mined by the Union Sulphur Company.

The first work was done by the Louisiana Petroleum & Coal Oil Co. Sulphur was found to occur in limestone at depth of five hundred to six hundred feet below the

surface, with a thick, overlying stratum of quick sand. The Calcasieu Sulphur & Mining Co. then acquired the property and attempted to sink a shaft by means of casing. This was a complete failure because of the immense quantity of water and the thick bed of quick sand encountered. In 1879 the Louisiana Sulphur & Mining Co. also tried to reach the deposit by shaft sinking, and failed in two different attempts.

Ten years later, the American Sulphur Company took up the work. A shaft was sunk to a depth of 250 ft. by means of a cylinder and shield, at which point the quick sand rushed in, filling the shaft and blowing everything out of the hole. Five men lost their lives in this attempt through asphyxiation by the poisonous gases rising from the sulphur zone. The American Sulphur Company then abandoned its work, after an expenditure fo $350,000.

Herman Frasch

This name will always be inseparably linked with the American Sulphur industry as that of the man who succeeded in making the great sulphur deposits of Texas and Louisiana commercially valuable, and who thereby gave to the United States domination of the sulphur markets of the world.

In 1891 Frasch became interested in the problem of working the deposit at Sulphur, Calcasieu Parish, Louisiana, and conceived the idea of melting the sulphur in place by means of superheated water, and pumping it to the surface in the liquid state. Subsequent tests proved the method, with certain modifications, to be mechanically successful, and all sulphur on the Gulf Coast is now mined by the method.

Before commencing operations, Frash obtained information from all of the companies which had tried to operate at Sulphur, but, unfortunately, most of it was misleading. Only the favorable aspects were set forth and the unfavorable ones concealed. The chief trouble was caused by a misconception of the nature of the deposit. As the sulphur was found in limestone, Frasch naturally believed the deposit to be similar to those of Sicily, and it would extend over a considerable area. Acting on this theory, he acquired some land within one and one half miles of the previous operations. Not until four barren wells had been sunk did he make the correct deduction that all the sulphur lay within the property of the American Sulphur Company. Acquiring this property, a drill hole was sunk, after much trouble, of sufficient size to fully determine the nature of the deposit. The first sulphur well was then drilled and equipped in a manner similar, in a general way, to all subsequent sulphur wells, except that a lift pump was used to elevate the molten sulphur. After "steaming" this well for twenty four hours, the pump was started, and the first liquid sulphur was pumped from the well. This occurred in January 1895.

Technically, the process was now a success, but not practically until the lift pump, which gave much trouble, had been replaced by an air lift, a device that had been previously used in many oil and water wells. After all these difficulties had been overcome, the process still faced commercial failure. The cost of heating the immense quantity of hot water required to melt the sulphur was prohibitive, as coal from Alabama, at a high price, was the only fuel available at that time. Some production, however, was made. During 1896 two or three thousand tons were extracted, and by 1898 a total of forty-five hundred tons.

In 1901, the fuel question was solved. That year Capt. A. F. Lucas proved his theory that the slight topographic elevation in Jefferson County, Texas, known as Spindle Top, overlay a structural dome and that the dome might be oil bearing. The discovery of this great oil field had two distinct effects on the future of the sulphur industry. It furnished an abundant and cheap supply of fuel, thereby insuring the commercial success of the Frasch process; and it lead to the drilling of a number of topographic domes in the Gulf Coast region, resulting in the discovery, in addition to many oil fields, of the other two sulphur deposits that are now being mined. These are Big Hill, the mine of the Texas Gulf Sulphur Company, and Bryan Mound, the mine of the Freeport Sulphur Company.

Following this discovery of cheap fuel, the Union Sulphur Company increased its production rapidly. The first notable output was made in 1903, when 23,715 long tons were extracted. From that time on the production increased until, in 1918, a maximum production for one year of 978,700 long tons was made; and a total production to the end of that year of over 6,000,000 long tons.

Freeport Sulphur Company

The next coastal sulphur deposit to be developed was Bryan Mound. As previously stated, the deposit was discovered in drilling for oil following the discovery at Spindle Top by Captain Lucas. Some further testing was done at Bryan Mound a few years later, and in 1911, Swenson & Sons acquired an option on the dome. This firm began the construction of a plant in Dec. 1911. The Freeport Sulphur Company was organized in July 1912, and in Sept. 1913 the holding company, called the Freeport Texas Company was incorporated. The first plant began producing April 18, 1912. Additional plants were built, making four in all with a total capacity of about 28,000 hp. The maximum yearly production by this company, a little over one-half million long tons, was made in 1917. All plants were closed down in 1921, on account of business depression, and remained closed until the summer of 1922.

Texas Gulf Sulphur Company

The dome in which the sulphur deposit of the Texas Gulf Sulphur Company occurs was originally known as Big Hill (the town that has been built at the mine by the Company is called Gulf). On the surface, Big Hill appears as a slight topographic eminence, rising to an extreme height of thirty seven feet above sea level and fifteen to twenty feet above the surrounding prairie. This topographic prominence induced the first development work following the Spindle Top boom. The area covered by the dome is several hundred acres. The cap rock is found at 850 ft. to 1000 ft. below the surface, and under an area three to four thousand feet in diameter. Systematic drilling has proved over ten million tons of sulphur.

The first well, drilling in 1902, blew in a tremendous "gasser". This created an excitement, many more wells were drilled, and an oil field of small size was opened. Big Hill continued as a producing oil field for three or four years, then the rapid encroachment of salt water and the discovery of better fields in the coastal region resulted in its total abandonment for several years. Sulphur was found in many wells during the period of oil well drilling, but the value of this discovery was not then recognized.

Messrs. Einstein and Harrison, who had done considerable drilling for sulphur at Big Hill, arranged in 1909 with Colonel Seeley, W. Mudd, B. M. Baruch and others for a more complete testing of the deposit. The results

of the drilling were highly satisfactory, and in the latter part of that year the Gulf Sulphur Company, with a nominal capitalization, was chartered. Nothing more was done after this campaign of drilling, other than to acquire property, until 1916.

The Gulf Sulphur Company, in that year, contracted certain drilling to the Producers Oil Company (now the Texas Company). Following the completion of that contract, the company began itself an active campaign of development, which resulted in the opening of the largest known sulphur deposit in the world.

On Jan. 27. 1918, the stockholders of the Gulf Sulphur Co. changed the name of the organization to the Texas Gulf Sulphur Co., and on July 16, 1918, the corporation was chartered with a capitalization of $5,000,000 (later increased to $6,350,000). At first the new company was disposed to postpone the construction of a mining plant, but the increasing demand for sulphur, due to the world war made advisable an immediate start in building. Construction was begun on August 13, 1918, and the plant was finished and placed in operation in March, 1919.

The first sulphur was produced on March 19, 1919. During the remainder of that year a production of over one thousand long tons daily was maintained, and during the years 1920 and 1921 about three times that amount. This large production has resulted in the accumulation of a sufficient supply in the stock piles to insure the ability of the company to fill all contracts, no matter what temporary shutdowns might occur in mining. The sulphur, like all Gulf Coastal sulphur, is of remarkable purity. Shipments are made on a basis of 99.5 per cent. pure when moisture free, but actually the sulphur is even purer than that.

Present Condition of the Industry

Following so closely the practically complete elimination of foreign sulphur from the American market and the invasion of the European market by the Union Sulphur and Freeport Sulphur Companies, it might be supposed that this tremendous additional production by the Texas Gulf Sulphur Company would have upset completely the equilibrium of the sulphur- mining business in the United States. This did not occur, however, for the latter company gained an outlet for its product by finding new consumers, especially among the previous users of pyrites.

At the present time the potential production of the Gulf Coastal mines is approximately 2,500,000 long tons annually. Of this, the Texas Gulf Sulphur is capable of producing over forty per cent., making it the largest sulphur mining company in the world.

Consumption of Sulphur

While a rough classification of the industries using crude sulphur as a raw material can easily be made, it is practically impossible to list completely those products in whose process of manufacture sulphur in one of its forms is used. In our every day life we are continually using articles which owe their present form or condition to the use of sulphur either as a constitnent or as a reagent. The great diversity of uses is indicated by a consideration of the very articles with which we are most familiar.

It is hard to realize that under this listing would fall not only the paper in the magazines we read, but also the glue, coloring matter and the photographic reproduction. In preparing the leather for our shoes, the paint for our houses, the coloring of our rugs, and even in the soap with which we wash, sulphur in some form is used. To carry the listing a little farther we may include the fuel and lubricant used in our automobiles the tires and the upholstery. Likewise the glassware on our tables, the preservatives in our food and the fertilizer which helped grow our foodstuffs must be included in the list.

A classification showing the industries using sulphur as a raw material and their relative importance as sulphur consumers throws an interesting side light on the economic importance of that material. As sulphuric acid production may be taken as an index of the economic condition of a country, so also may sulphur consumption be considered. An exhaustive study of this phase is out of place in an article such as this, but a few tabulations may prove interesting.

A broad division of the industries in which we are interested follows:

1. Acid and Chemicals
2. Acid Phosphate
3. Paper
4. Agriculture (other than acid phosphate)
5. Rubber
6. Galvanizing
7. Explosives

The relative importance as indicated in this list is taken from statistics of the past two or three years and is by no means to be considered fixed. On the contrary, the order may be changed from time to time, as many of these indnstries may be considered seasonal, and all are peculiarly susceptible to change under verying economic conditions.

It will be seen that an attempt has been made to simplify the list as much as possible. The close interrelation and the many subdivisions of the various industries are recognized by the writer, but without recourse to an extensive tabulation of statistics an attempt to expand would be successful only in confusing the listing.

A shorter tabulation showing approximate percentages may prove interesting.

A	Acid and Chemicals	35%
B	Fertilizer (Including divisions 2 & 4 above)	30%
C	Paper	27%
D	Miscellaneous (Divisions 5, 6, 7, above)	8%
	Total	100%

Sulphur Imports of Canada in Gross Tons

	U. S.	Other Sources	Total
1900	2,250	6,891	9,141
1901	1,500	9,510	11,010
1902	3,110	7,530	10,640
1903	1,630	9,280	10,810
1904	2,830	5,814	8,644
1905	2,800	7,650	10,450
1906	11,300	8,854	20,154
1907	5,480	6,063	11,543
1908	14,700	8,417	23,117
1909	7,650	12,000	19,650
1910	11,500	7,680	19,180
1911	13,400	8,155	22,555
1912	14,350	5,605	19,955
1913	26,000	6,555	32,555
1914	23,300	3,360	26,660
1915	34,950	3,915	38,865
1916	31,150	2,732	33,882
1917	70,750	4,249	75,000
1918	65,900	482	66,382
1919	86,900	76	86,976
1920	70,700	—	70,700
1021	106,000	10	106,010

Use of Sulphur in Canada

The above table, taken from various official publications shows the total sulphur importation of Canada for the year 1900 through to 1921 inclusive. For convenience it has been subdivided to show the tonnage derived from different sources.

The report is for fiscal years ending June 30, with the exception that for the years 1908, 1909, 1919, 1920, 1921 the fiscal year ends March 31.

The reflection of the remarkable growth of the sulphite pulp industry in Canada in the last twenty years is the outstanding feature of this table. Disregarding the small tonnage of sulphur consumed by other industries, we may say that the use of sulphur in the sulphite pulp industry has grown over 1,000 per cent. in that interval of time. From less than 10,000 tons yearly, it has increased until it now amounts to over ten times that quantity. Undoubtedly a certain part of this increase was due to the changing from pyrite to the cleaner, less bulky and more convenient sulphur but the amount thus involved can effect but a slight flattening of the progress curve.

A second observation, inevitably made after a glance at the table, is the marked increase in use of the sulphur mined in the Gulf Coast region. From a modest beginning, barely 25 per cent. of the total in 1900, it reached a maximum in 1920 and 1921, when but 10 tons was imported from other sources.

Many other comparisons with which we may not deal here will occur to the reader. The obvious question arising however is the future consumption of Canada. That it will amount to at leat 100,000 tons yearly, we may reasonably assume; but how much it will exceed that figure, time and Canadian initiative alone will tell.

A Budget From New York

by Kirby Thomas

Bauxite from British Guiana

A few years ago discovery was made of extensive deposits of bauxite, or hydrated oxide of aluminum, in the interior of British Guiana, not far from Georgetown. Some shipments of the product were made to England and the United States in a crude form, principally to supply the demand of the companies engaged in the production of metallic aluminum, although some of the material was used chemically to produce the various alums and other compounds. About 1917, the Aluminum Company of America, which is the largest producer of aluminum metal in the world and which practically controls the American market, secured by purchase and concession a very large area of the bauxite formation, which includes, according to reports, a practically inexhaustible supply of the material. The company has been carrying on extensive investigations and developments and is having built a fleet of six steamships, which will be used exclusively in the transport of the material to Gulf ports and St. Louis by water, from which point it will be distributed to the company's plants.

It was reported that at one time the British authorities were averse to having this important resource in a British colony pass into American control, but this matter seems to have been adjusted and the development of this new business promises to be large in volume and in value, and to become a factor in the development of American trade with a South American country, which has heretofore been in close commercial control of British interests.

The domestic supply of bauxite, found mainly in the southern states, is small and quite inadequate for the large and growing demands of the aluminum industry. Considerable quantities of the ore have been supplied from France. The standard grade, 52% alumina with less than 2% iron oxide, up to 20% silica and not more than 1% free moisture, is quoted at $10 per gross ton at the mine in this country. The improved grades bring up to $13 a ton, and special prices are paid for unusually highgrade material.

Minerals for Radio Apparatus

The mining industry is doing its "bit" to help along the development and perfection of the new radio apparatus which is coming into such great demand. Certain crystallized forms of minerals are required for the receiving equipment. The minerals most favored are pyrite or calcopyrite, the first a combination in chemical form of sulphur and iron and the other sulphur, iron and copper. It is claimed that the clearness with which messages may be received depends to a large degree upon the perfectness and quality of the crystal used. A demand for suitable crystals has caused the mining operators to search over their ores and to submit perfect crystals for the radio manufacturers. Meanwhile there is a constant search for a dependable supply of the best material. Few amateur radio enthusiasts, probably, are aware that there is one material in their apparatus that cannot be replaced by any substitute that scientists have yet discovered. This material is mica, a mineral substance found in nature that has unique dielectric properties: that is, it resists the passage of electricity even at remarkably high voltages. It seems unbelievable that thin sheets of this transparent material, only one thousandth of an inch thick, can successfully perform this necessary function. If it were not for mica the electric flows would be hopelessly tangled and the receiving set as well as the broadcasting apparatus would be useless.

BAUXITE IN TRANSYLVANIA

According to the *Mining Journal*, London, the bauxite deposits of Transylvania (formerly in Australia and now part of Roumania) are the largest so far discovered in the world, the tonnage of ore being estimated at 20,000,000 tons. The quality is said to be only second to that of French bauxite. During the war the deposits were worked at several places, but at the present time their exploitation is in the hands of only two firms—the Alumina Company and the Bauxita Company—who are exporting the mineral to Germany and Switzerland. Permission for exportation has been given on condition that in course of time the two companies named establish the manufacture of aluminium in the country itself on a sufficiently large scale to supply its requirements; this, it is considered, should not be very difficult, as the other raw materials necessary for the manufacture of aluminium are also available locally in adequate quantities. American aluminium manufacturers are said to be taking an interest in the mines, with a view of obtaining supplies of bauxite.

Mineral Production of Ontario

RETURNS FROM METAL MINES AND SMELTERS FOR FIRST NINE MONTHS OF 1922

Returns received by the Ontario Department of Mines from the metalliferous mines, smelters and refining works of the Province for the nine months ending Sept. 30th, 1922, are tabulated below, and for purposes of comparison the quantities and values are given for the corresponding period in 1921. Tons throughout are short tons of 2000 lbs.

ONTARIO'S METALLIFEROUS PRODUCTION — FIRST NINE MONTHS, 1922

PRODUCT		Quantity		Values	
		1922	1921	1922	1921
Gold	ounces	749,631	474,956	15,506,896	9,818,073
Silver	ounces	7,560,301	6,586,910	5,609,625	4,382,520
Platinum metals	ounces	113	915	7,771	41,060
Nickel (metallic)	lbs.	6,982,217	4,521,407	2,012,539	1,542,607
Nickel oxide	lbs.	470,529	975,310	81,160	197,812
Other Nickel compounds	lbs.	27,270	169,885	2,231	15,936
Nickel in matte exported (*)	tons	2,927	2,908	1,595,500	1,454,000
Cobalt (metallic)	lbs.	22,173	30,564	60,932	91,786
Cobalt oxide	lbs.	293,364	162,364	589,883	330,914
Cobalt — Nickel oxides and residues	tons	501	183	218,556	116,942
Lead, pig	lbs.	2,593,888	2,539,551	147,698	134,871
Copper sulphate	lbs.	22,553	99,553	1,310	5,973
Copper (metallic)	lbs.	2,104,323	2,926,407	245,489	330,084
Copper in matte exported (*)	tons	3,191	2,886	596,860	451,760
Iron ore (**)	tons	4,304	22	25,261	99
Iron, pig (***)	tons	12,296	82,318	291,926	2,079,729
TOTAL				26,928,637	20,994,172

* Copper in matte was valued at 8 and 9 cents per pound in 1921 and 1922 respectively, and nickel in matte at 25 cents per pound in both years.

** Figures in the table cover shipments to points other than Ontario blast furnaces.

*** Total output of pig iron from both domestic and imported ore was 237,827 tons worth $5,646,536. Figures in the table represent proportional product from Ontario ore.

Gold

A marked increase in gold output is the outstanding feature in Ontario's metalliferous production for the period under review. Not only is Ontario a leader among the Canadian Provinces, but for the full year 1922 will undoubtedly surpass California whose gold output was $15,704,822 in 1921. For the third quarter of the year Ontario's production was at the rate of over 22 million dollars per annum or about one-eighth that of the Transvaal for the same period, the average monthly rates being: Ontario 91,100 ounces; Transvaal—743,400. The Hollinger mine alone, now treating around 4500 tons daily, plans increased milling capacity equal to the total of Ontario's producing mines at the present time, or approximately 7000 tons per day. This expansion is dependent on increased power supply. Two new hydro-electric power projects are now being developed—one at Sturgeon Falls on the Mattagami river of 6000 to 7000 horsepower, and one at Indian Chutes on the Montreal River of similar capacity. Some of this energy should be available by February next.

For 1921 the exchange premium averaged 11.61 per cent. By the end of August 1922 Canada's currency had reached par. The exchange really amounted to a bonus for the gold mining industry. Canada is the first combatant country suffering currency depreciation as a result of the Great War to get back to normal. The total exchange premium received by gold mines for the 9 months' period was $183.354.

Gold Production, First 9 months, 1922

Source	Ore milled	Gold Output		Silver Output	
	tons	ounces	Values	ounces	Values
PORCUPINE					
Dome	269,250	148,554.94	3,062,533	21,740.4	14,673
Hollinger	1,100,738	446,096.62	9,221,635	78,277.9	53,023
McIntyre	149,961	72,834.39	1,505,620	13,229.6	8,991
Total	1,519,949	667,485.95	13,789,808	113,247.9	76,687
KIRKLAND LAKE					
Kirkland Lake	27,037	8,469.67	175,084	953.9	648
Kirkland Lake Proprietary	11,190	3,405.74	70,403	1,415.9	983
Lake Shore	19,116	18,991.80	392,595	1,539.9	1,042
Ontario — Kirkland	6,496	483.25	9,989	142.9	93
Teck — Hughes	31,264	22,229.93	459,533	1,815.5	1,234
Wright — Hargreaves	52,713	29,373.27	605,586	3,747.2	2,545
Total	150,816	82,953.66	1,713,190	9,615.3	6,545
Miscellaneous					
Cobalt — Frontenac	——	50.20	1,038	26.2	18
White Rock	——	47.42	980	10.1	7
Nickel-Copper refinning	——	93.88	1,880	——	——
		191.50	3,898	36.3	25
GRAND TOTAL	1,670,765	750,631.11	15,506,896	122,899.5	83,257

The outlook for Ontario's gold mining industry was never brighter. Developments to date and ore blocked out give assurance of permanence. Several prospects are likely to become producers soon. There are many promising areas under development, such as Night Hawk lake, Lebel and Gauthier townships, West Shiningtree, Larder Lake, Matachewan, Painkiller Lake, and others, also some old mines in Northwestern Ontario.

Details of production are given in the above table.

Silver

Silver production has been well maintained. South Lorrain is attracting much attention as a result of the excellent showing being made by the Keeley and Frontier mines. Both the Miller Lake O'Brien and Castle-Trethewey mines at Gowganda made shipments. The average New York price of silver for the period was 68.137 cents per fine ounce. Shipments of ore, concentrates and residues over the T. and N. O. railway totalled 1015 tons to foreign countries, principally the United States, and 5796 tons to Southern Ontario refineries. Mines shipping over one half million ounces are given in order: Nipissing-2,959,411; Mining Corporation of Canada-1,289,401; O'Brien-884,030; Coniagas-826,820 and Keeley 540,350. A summary of shipments follows: Cobalt-6,473,970 ounces; South Lorrain-840,466; Gowganda-118,000; recovery from gold ores-112,890; nickel-copper refining-4,975 ounces, a total of 7,560,301 fine ounces.

Refineries Plants at Deloro and Thorold recovered 1,210,566 ounces of silver and marketed 3,221,791 lbs. of white arsenic worth $223,949. With the exception of the bulk of the metallic nickel and nickel oxide recovered by nickel refining plants, southern Ontario refineries produce all of the other nickel and cobalt compounds noted in the table.

Nickel-Copper

After a year's shut down at the Creighton mine of the International Nickel Company of Canada, work was again begun Aug. 26th. The Copper Cliff smelter re-commenced operations on Sept. 1st when the converters were put in blast, and the Port Colborne refinery re-opened on May 1st. Nickel-copper matte in stock held by the Mond Company has been cleared out for the first time since the armistice. The average price of electrolytic copper was 13.25 cents per pound for the nine months.

During the period 178,044 tons of ore were smelted and 8857 tons of nickel copper matte produced. In addition to nickel and blister copper, gold worth $1880, silver valued at $3450 and platinum metals as noted in the table, were produced. A large part of the nickel oxide marketed was produced from nickel-copper matte.

SICILIAN SULPHUR

Italian sulphur exports are confined almost entirely at present to European countries and the eastern Mediterranean. Antiquated methods of extraction in the Sicilian mines, combined with high daily wages paid to ineffectively utilized labor, have resulted in a generally high cost of production. Consequently, many former markets have been lost in whole or in part to American sulphur exporters despite the disadvantages for the latter arising from the comparative levels of dollar and lira exchange. During the nine months ending with March, 1922, Italy exported 54,402 metric tons of sulphur, valued at 44,666,740 lire, the amount shipped in the first quarter of 1922 being 36,434 tons, valued at 29,493,350 lire. Greece was the leading purchaser of Italian sulphur in the first three months of the current year, taking 16,280 metric tons, followed by France, with 4,344 tons; Germany, 2860; Smyrna, 1,588; Asiatic Turkey, 1,544; Austria, 1,340; and Yugoslavia, 1,045 tons.—U. S. Commerce Reports.

GOLD IN MACKENZIE AREA

An inquiry to the Geological Survey at Ottawa, ever a fruitful source of information and as yet far from fully appreciated by the public, has brought following information about gold in the Mackenzie River district, which has been the subject of newspaper reports recently.

In regard to the reported strikes of gold quartz in the Mackenzie area, the only one that has come to the attention of the Geological Survey is the prospect on Cariboo Island at the east side of Great Slave Lake. The rocks were discussed briefly in the Summary Report of the Geological Survey, 1921 part B. At the time the Geological investigation for that report was made, very little development work had been done but this last summer a shaft was sunk to the depth of 60 feet and some very good showings of gold are reported to have been found. The property has not been inspected officially since the recent developments were made and the extent of the discoveries is unknown. Samples that were obtained from the property by several members of the Topographical Survey, who were mapping that part of the lake this last summer, showed free gold in very encouraging amounts but how much gold bearing material is represented by such grab samples has, as far as I am aware, not yet been determined.

Placer gold has been reported on several streams that enter the Mackenzie. The area of most interest this last summer was "The River between Two Mountains" which enters the Mackenzie near Old Fort Island south of Wrigley. As can be seen from the map by Dr. M. Y. Williams published in the Summary Report, G. S. C. 1921, pt. B. the river flows over sedimentary rocks that are not likely to be gold bearing.

During the winter of 1921 a number of claims were staked for placer on the South Nahanni River, tributary of the Liard flowing out of the mountains to the west. It is certain that colors can be obtained at many places both on the South Nahanni as well as the Liard but whether the gravels are rich enough to work commercially has not yet been proven. Very little development work has been done on the South Nahanni but it is of interest to note that prospectors from that country have brought out samples of Galena (very slightly silver-bearing), and Chalcopyrite, the former being reported to occur in some considerable amount. It is claimed there are intrusive rocks on the South Nahanni but as far as I have been able to learn no samples have been brought out. However the finding of intrusive rocks is not new in the mountains to the west of the Mackenzie. Mr. J. Keele reported them on the Gravel River (*A Reconnaissance across the Mackenzie Mountains on the Pelly Ross and Gravel rivers*, G. S. C. 1910, pub. 1097, page 42.) and they are known elsewhere in the Norman area. There is thus reason to believe that they are present on the South Nahanni as has been reported.

Investigations by the Electrolytic Zinc Co. of Australia have showed that sulphuric acid can be manufactured with greater economy from pyrites than from the sulphurous gases produced by the metallurgical treatment of their ores. The sulphuric acid is required to treat the phosphate rock imported into Australia for use as fertilizer.

Operators on the Malagash, Nova Scotia, salt property have discovered, at a depth of 200 feet, a six foot face of almost pure white salt, which analysis has proven to be 99.4 per cent pure. The owners state there is a very large supply of this product and that it is apparently improving in depth. The discovery of the salt bed has opened a valuable new industry in the district.

PROSPECTING REGULATIONS ALTERED

Staking by Proxy on Dominion Lands Now Allowed

Provisions which facilitate prospecting for minerals naturally increase the rate at which the development of our great mineral resources proceeds. In his address at the annual general meeting of the Canadian Institute of Mining and Metallurgy held in Ottawa, in March, 1922, the President Mr. C. V. Corless, an officer of one of the big corporations developing nickel deposits at Sudbury, referred to the great area of Canada which is suitable for prospecting for minerals. In addition to large areas in Quebec and Ontario, he pointed out that two-thirds of the province of Manitoba , one-quarter of Saskatchewan, two thousand square miles of Alberta, and a large portion of the Northwest Territories were also in the pre-Cambrian area, a formation which he claimed should be thoroughly prospected, as many of the big mines of Canada were in that formation.

There are many people following other occupations than mining who would like to participate in the mineral wealth of the great unexplored regions. They can always buy stocks in companies formed to develop new finds, but this does not appeal to them to the same extent as backing a real prospector and sending him into the field. Such persons are unable to leave their present occupations and would probably not be of much use in the field if they attempted to engage in the business of searching for minerals.

Real prospectors are not plentiful, and when found, it is to the interest of the whole community that they should not lack the means to enable them to continue prospecting. The supplying of a prospector with food, tools, and equipment is known as "grubstaking." An agreement is usually signed by the prospector by which he agrees to transfer a prescribed interest in any location he makes to the "grubstaker."

To enable any person to assist a prospector, a provision has been inserted in the Quartz Mining Regulations which apply to all Dominion lands that a prospector, before proceeding on a bona fide prospecting trip, may file with the mining recorder of the district one or two (but not more than two) powers of attorney to stake. Accompanying each power of attorney there should be evidence in the form of a declaration that the person granting the power of attorney has furnished the means to enable the prospector to proceed on the trip. If the prospector succeeds in locating a deposit of minerals which he considers advisable to stake, he can locate a claim for each of the persons who granted him a power of attorney to stake, in addition to locating one in his own name, and in due course he can file applications on their behalf with the mining recorder, but the grants for the claims are issued in favour of the "grubstaker" who in this way acquires title.

By means of the plan provided, any person over eighteen years of age, irrespective of nationality, residing any place in the world, can grant powers of attorney to stake to prospectors desiring to prospect on Dominion lands. This provision applies to all minerals defined as such in the Quartz Mining Regulations, and a similar provision appears in the Yukon Placer Mining Act and in the Placer Mining Regulations relating to Dominion lands outside of the Yukon Territory.—From "Natural Resources," Ottawa.

COAL AND THE RAILWAYS

About half the freight loaded on our railways, according to an estimate made by a well-informed man experienced in both mining and transportation, is contributed by the coal mines. This portion includes coal loaded at the mines and coke loaded at the ovens, both consigned to consumers all over the country, and coal loaded for the railroads themselves, as well as articles of mine equipment and supply loaded at industrial centers more or less distant from the coal mines. Even though this figure may later be shown, on fuller presentation of the facts, to be somewhat high, the big outstanding truth is that the coal mines and the railways are co-partners on a large scale in the business of the country. This co-partnership, based on mutual interest, — the railways being the largest purchaser of coal and the mines being the largest customer of the railways—gave special significance to a conferenee held recently between a representative committee of the American Railway Association and the United States Coal Commission.

The railway men present at that conferenee showed their desire to co-operate in the work of fact-finding by suggesting subjects on which they could contribute statistical facts. The perennial topic of car shortage is only the introduction to the larger questions—What investment in railway equipment is justified to meet the demands of an overdeveloped mining industry? What can the public afford to pay to accommodate its own seasonal demand for coal? The operating officials of the railways can also point to the effects of seasonal movement of coal and other commodities on the cost of operation of their roads.

The coal operators are themselves not unmindful of the peak demand for transportation arising in part from the seasonal demand for coal. One large mining corporation in the Middle West has several times made its annual appeal to its customers for early purchase of coal in the form of a full page reproduction of a photograph of two huge locomotives snow-bound on the track, with the simple legend "Lest you forget 1917-18." Such a reminder is pertinent every year, for the greater part of the American public either forgets or has never learned the obvious connection between snow-clogged freight yards and delayed coal at the very time when coal is most needed. How much of this seasonal burden on the railways can economically be avoided is one of the questions the American Railway Association can help President Harding's Coal Commission to answer. Possibly the consuming public can itself also help in lowering the cost both of hauling coal and of mining it.

In Alberta and parts of British Columbia, Canada has the same problem to face. It is quite possible that, if all those interested in the production and use of coal combine to solve the problem, its price to the consumer can be lowered at the same time as the wages to the miner, profits to the operator and freight for the railways are made more consistent and more satisfactory to all.

A Russian oil geologist, Captain de Hautpick, has published in Australian and London mining journals a series of articles designed to prove that anticlines are unnecessary to the accumulation of petroleum in commercial quantities. He supports his conclusion with experimental data.

The Mining Districts

BY THE JOURNAL'S CORRESPONDENTS

NORTHERN ONTARIO

Branch Railway Mooted.—It is understood that the T. & N. O. Ry. Commission is considering the construction of a branch line east from Swastika. This line, if built, would serve a rapidly developing mining district, and would pass through Kirkland Lake, the Pancake Lake district, where the Crown Reserve is meeting with good results, Gauthier Township, in which the Argonaut Mine is situated, and would be carried to the vicinity of the Quebec border, where it would help to serve the newly discovered district in Quebec, about which such favorable reports are heard. These different gold sections deserve much better transportation facilities than they have at present, and the construction of a branch line to serve them would stimulate development. Despite the greatly increased importance of Northern Ontario's gold camps, the T. & N. O. has not, during the past ten years, built a single mile of railway to serve the mines.

Power for Porcupine.—Officials of the Northern Canada Company expect to have 3000 h.p. from the new Sturgeon Falls development ready to distribute by the middle of January. This will take care of immediate needs, but will not allow for any expansion in the camp. The Northern Canada Power Company, with this latest development, would appear to have almost reached the limit of the power which it can produce, and it is evident that something will have to be done meet the growing needs of the district. While this additional power from Sturgeon Falls will take care of present consumption in the camp, it will not permit of sufficient power to supply any new mines which are developed, or to take care of the expansion of the present ones. The Hollinger, with its proposed increase in capicity, will need a much larger amount of power. This company does not appear to have received sufficiently satisfactory guarantees from the Ontario Government to permit of its going ahead with the development of power on the Abitibi River, as the company feels that the Government restrictions are altogether too severe. It is understood that the Great Northern Power Caompany, which was recently known as the Matachewan Power Company, will extend its transmission lines to Porcupine, and will take care of the Davidson, at least. It will also pass close to the Argonaut and Pancake Lake sections. If this company meets with sufficient encouragement it should be able to relieve the situation. The capacity of its present development is understood to be only about 6500 h.p., but the company owns another power site further up the river, which is capable of greater development.

Cobalt.—A Canadian company is being formed to take over the Keeley Mine in South Lorrain. The present company is an English one, and the shares are not listed in this country.—The Nipissing has dropped its option on the Burnside-Bryce claim, which lies to the east of the Burnside property in Kirkland. Several diamond drill holes were put down, but the results obtained were not sufficiently encouraging to justify the Nipissing going ahead with further development work.—Shipments of residues from the camp still continue high. During October the Mining Corporation shipped 1176 tons and the Nipissing shipped 889 tons of residues. The Coniagas was the only other shipper, with one car of 44 tons. During the week ending November 24th the McKinley-Darragh, with a car of flotation concentrates, was the only shipper from Cobalt.

Kirkland.—The annual report of the Teck Hughes, while showing satisfactory results for the past year, holds out much greater encouragement for the future. During the year ending August 31st, the company treated 43,300 tons of ore, averaging $11.11 a ton, at a cost of $7.09 a ton, and made a net profit of $111,800. The balance sheet still shows a deficit of $366,241, practically all accounted for by the outstanding bonds, which amount to $339,000. As the cash on hand amounts to $175,000, and as profits during the past few months have been running exceptionally high, it is believed that the bond indebtedness can very shortly be paid off. The average grade of ore for the year was slightly over $11.00 per ton, but in July the grade was $23.14 and in August $23.50. In September, which is not included in the fiscal year, the grade was $43.79 a ton, and the mill recovered approximately $118,000, from which it is expected that a profit of around $70,000 could be made. The report states that the year's operations were very satisfactory, and that important ore bodies were found in the No. 1 vein at the 7th. level which hold out very good possibilities for the future of the mine at depth.—The Thompson-Chadbourn Syndicate has taken an option on the Smith properties in Catharine Township, and will sink a 100-foot shaft. This syndicate is also very active in Quebec, and is doing a considerable amount of work there.—The Argonaut Mine has made an important discovery on the 500-foot level, and it is understood will proceed with the completion of the mill.

Porcupine.—The McIntyre is continuing its drilling programme on the Schumacher Veteran claim, adjoining the Dome, and while no reports have been given out regarding results, it is understood that nothing of much importance has been cut. The company is, however, meeting with exceptionally favorable results on the McIntyre property, and the No. 7 vein has now been proved for a length of 1200 feet on the 1870 foot level, and it is understood to average approximately $20.00 across a width of 12 feet. This makes it one of the most important ore-bodies in any mine in Canada. The company has declared a dividend of 5 per cent., payable January 2nd. Some little trouble has been experienced by the settling of the foundations under the new mill building. It is not thought, however, that the trouble will be very serious. Work at the Vipond has been temporarily halted on account of a break to the machinery. Repairs, however, will be made in a few days. The company's shaft is down to 1000 feet, and three new levels will be opened up between that depth and 600 feet.

During the first half of 1922, calcium carbide to the amount of 2119 tons was made in Tasmania. The embargo on the importation of carbide under which this industry in Tasmania was fostered is now abolished, but it is to receive further protection from the Australian anti-dumping act.

NOVA SCOTIA

Rail Mill Operating.— The rail mill at the Sydney steel plant which has been idle since last February, began to roll rails in the first week of December. A number of mechanics have for some time past been making repairs and putting the mill in good condition. The order on hand amounts to twenty-five thousand tons, and it is hoped that other orders may be booked up before this one is filled.

The Newfoundland Venture.— A powerful group of British capitalists has acquired control of large areas of pulp land in Newfuondland, and intend to construct a mammoth paper plant costing eighteen million dollars. The British Treasury has guaranteed the interest on nine million dollars of bonds toward the project and Newfoundland the remainder. The plant will be located on the Humber River at Bay of Islands on the west coast. It is a wide, deep, rapid stream, which is capable of developing an enormous amount of electric power. For several miles from its mouth it is navigable for ocean-going steamers, and for shipment by water, all that is necessary is the erection of suitable piers. The people of Newfoundland are said to be enthusiastic about the scheme. They realize that the addition of nine million dollars to their country's liabilities will mean heavy taxation, but they are willing to undertake the burden, strong in the belief that in time the investment will give large returns.

Works Committee Refused.— The proposal to form a works committee to deal with disputes arising at the Sydney steel plant, made by Superintendent Bischoff, was turned down at a meeting which was more representative of the Labor Party than of the Sydney steel works employees. A counter proposition was made which smacks strongly of the One Big Union. It carries with it a six-hour day and five-day week. This is labor politics, pure and simple, and goes to show that the labor leaders of Nova Scotia are without a proper sense of responsibility and are unfit to direct the affairs of the workmen. Sydney steel plant has not yet reached the stage of producing to capacity, yet there are not wanting those who would, by their theories and fads destroy the chances of adding to the comparatively light orders now being filled.

Classes Well Attended.— The First Aid to the Injured classes have been in operation for two successive Winters. The number of miners and others from the Glace Bay district attending was close on 500. Of these about 250 received certificates after successfully passing the examinations. Only twenty-five of this number qualified for the Voucher that is given to second year men. Considering the labor turmoil, the terrific snowstorms and the epidemics of last winter, the progress made along this line is atisfactory.

The two hundred and fifty trained men who did not test their knowledge by examination may be counted as an asset and they will, with the others, do much useful work round the collieries and the works.

Inspection of Wabana Mines.— Vice-President D. H. MacDougall made a tour of inspection of the Wabana ore plant, Newfoundland, and expressed himself as being highly pleased with its splendid condition and the progress of development. It is the intention of the present management to follow the example of the Cape Breton colliery district and plant flower gardens, use paint freely and to generally beautify the grounds. From what we know of the tastes of mechanical Superintendent J. B. Petrie, who is fond of gardens of all kinds, Wabana will next year put on a new appearance.

Rapid Loading.— The S. S. Daghill, loading ore at Wabana, took 11,000 tons in four hours and twenty minutes. Only one chute was used. The actual loading time was 2 hours and 45 minutes. Shifting the ship for the ten hatches took 1 hour and 45 minutes. The loading facilities at Wabana are almost perfect.

Iron Mine Re-opened.— The No. 3 ore mine, Wabana, which for the past three years has been filled with water, has been pumped out and is again a producer.

Clean Stock Piles.— All the old ore stock-piles are being cleaned up and refuse ore taken away. The new stock-piles will begin on clean floors, like coal piles and each year's refuse will in future be removed with the pile. This will give the stock-piles a clean fresh appearance.

BRITISH COLUMBIA

Government Engineer Describes New Placers.— Cedar Creek, Cariboo district, was boomed as a new and wonderfully rich placer field early this year. Prospectors hurried into the district as soon as the snow disappeared. There was the confusion usually met with in "rushes", there were many disappointed, and disgruntled ones returned to give the discovery a "black eye." For these reasons it is gratifying to be able to quote J. D. Galloway, Government Mining Engineer, as saying that the Cedar Creek strike is one of great importance, the outstanding incident in placer mining development of this Province of the year. "The total production of the Camp", he states, "has been about $75,000, almost all of which has been produced by rockers. This," he observes, " is a very creditable start for the first year and from all indications a larger production should be made next year."

But it is not so much the actual value of the Cedar Creek find that Mr. Galloway dwells upon, although that it not minimized, as its importance to the entire Cariboo. The gold was on high ground, a ridge that there was reason to believe had been the original bed of a creek, and if the theory proved sound in this instance is there any reason why it should not be applied with success in many other places in that great central plateau? Mr. Galloway answers, "No", and believes that the proving of Cedar Creek has opened up wide possibilities for placer discovery and the development of gold mining in the historic Cariboo.

Mr. Galloway's account of Cedar Creek is the first description of the "find" by a government engineer and therefore is of special interest. He says:

"Cedar creek was worked for placer gold in the sixties and a certain amount of gold was taken out. These old workings extended from Quesnel lake upstream for about two miles. This part of Cedar creek runs in a deep gorge for the most part, except near the lake where there is a delta deposit.

"In the fall of 1921 Lyne and Platt commenced prospecting on the southern side of Cedar creek about one-half mile back from, and 600 feet above, the creek. In this work they were carrying out an old theory that the gold found in the bed of Cedar creek came from an old high-level channel through which Cedar creek had cut. The discovery was made in a small, shallow draw or flat depression which drains into the canyon of Cedar creek. The discovery was staked as a lease by Platt, but owing to faulty location

the discovery ground was later found to be on Steven's lease, a later location. Pay ground was, however, found on the Platt lease in a draw lying a little to the south-east of the discovery draw. Lyne staked a lease to the north of the Platt lease, but so far no pay ground has been found on it. The Sheridan lease adjoins the Platt ground to the south-east and this contains good pay.

"These placer deposits are unique as they differ very considerably from the usual types found. The country is more or less a flat plateau and heavily wooded. There is no well-defined creek but the abundance of seepage water makes it difficult to sink holes without pumping machinery.

"In the discovery draw the bedrock is only from 4 to 6 feet below the surface. In many places there is 2 to 3 feet of black vegetable muck and then 2 to 3 feet of broken bed-rock, gravel and inter-mixed clay. The gold occurs in this mixed gravel or on the bedrock and partly in crevices in the bed-rock. On the Platt lease the ground is from 6 to 12 feet in depth. Generally the upper half of the gravel consists of glacial drift, which is practically barren of gold, and the lower half is gold-bearing with probably the greater portion at and near bed rock. The richest ground in any of the diggings is on the left bank of the discovery (Stevens lease) where some phenomenally rich pay dirt has been taken out. In six days 528 ounces of gold was taken out with two rockers working; these rockers each handle about 1½ cubic yards a day. This ground therefore carried about $500 a yard.

"There seems little doubt that these deposits are pre-glacial in age, although in part, as in the lower end of the discovery draw, they have been displaced and partly re-worked by glacial and post-glacial action. The gold is coarse and nuggety and from its physical appearance has not travelled far. In value it averages about $17 an ounce.

"It is reported that the deposit on the left bank of the discovery draw is continuing in a south-westerly direction and it is now evident that it is of more importance than the discovery draw itself. This ground is from 6 to 15 feet deep, with pay in the lower 2 to 4 feet of gravel.

"The Stevens, Sheridan and four other leases were obtained under option by the Cedar Creek Mining Company early in the summer. This company has carried on steady operations and has had from 2 to 4 rockers continuously operated. Late in the fall a small plant was put in, consisting of a gasolene engine and pump and line of sluice boxes. Water is obtained by a line of ditches to a small reservoir and from this the water is pumped up to the head of the boxes. It is difficult to get any water for sluicing, but in this way the water is caught by a return system and used over again.

"The Platt and Lyne leases are now controlled by McCaskill and Wright and the Platt ground has been worked by means of rockers. Litigation and injunctions tied up the Platt property during most of the summer but now all this has been settled."

* * *

Government Grant for Roads.—Some $95,000 is expected to be spent by the Provincial Government next year in road construction in the Portland Canal mining division. There is some work from the townsite of Stewart to the wharf that will mean an expenditure of $30,000 and it is stated that two spans are to be thrown over the Bear River at the site of the present bridge, costing between $25,000 and $30,000. The Bear River waggon road is to be improved, it being understood that the construction is to extend as far as American Creek. All this would indicate that the government is alive to the importance of mining developments in this section.

G. A. Carlson, of the firm of Seims & Carlson, Spokane, Wn., is quoted as stating that he has a contract for the building of 13 miles of railway up the Salmon River Valley. The line is said to be planned to start from tidewater at a point near Hyder, Alaska, proceeding up the east side of the valley, thus serving a number of promising properties.

Grant Mahood, president of the American Mining and Milling Co., operating on Fish Creek, Salmon River, states that developments continue satisfactory. He says that No. 1 vein is showing up well and adds "Have struck a body of high-grade ore averaging $100 to the ton." This is the result of work on a new tunnel which was started some months ago.

Alice Arm.—At Alice Arm, Portland Canal district, the Esperanza Mine is being operated steadily. Milling ore now is being taken out but the owners expect to break into the high-grade soon. They will ship the latter ore during the winter.

Activity near Kamloops.—The Windpass Mine, Chu Chua, near the town of Kamloops, a lode gold property, has been taken over by General Leckie with whom is associated W. R. Wilson, president of the Crow's Nest Pass Coal Co., and Messrs. Trites and Wood, of Fernie. The Queen Bess, a silver-lead property in the same district, has been reopened. There are said to be indications of natural gas in the vicinity of Kamloops and the oil and gas rights on Hudson's Bay property are being secured by enterprising citizens who plan to do some drilling.

Good Production of Gold-Copper Ore.—The Belmont Surf Inlet Mine, on Princess Royal Island, off the West coast, is producing at a rate of about 12,000 tons a month, and the ore is said to average $9 a ton in its values. More plant and general equipment are being installed.

Cariboo Pioneer Dead.—Col. "Bob" Stevenson, said to be the last of the pioneers of the Cariboo gold rush, died recently in Vancouver. He was 81 years old and came to British Columbia in 1859. Perhaps the best known of Col. Stevenson's adventures was his journey from the Cariboo to Victoria in the sixties with the body of the wife of "Cariboo" Cameron. Cameron, who struck it rich in the Cariboo, offered $12 a day and $2,000 to anyone who would accompany him with his charge through the snows of a hard winter. All refused save Stevenson, and the two, it need scarcely be said, suffered terrible hardship before reaching their destination. The Colonel then refused any pay for his services.

Good Production from Mayo Camp.—It is reported from Dawson that the winter output of the Mayo Silver Camp will exceed expectations. Keno Hill Ltd. will produce about 1,000 tons and the Treadwell Yukon Ltd., about 3,000 tons before the opening of navigation. This will all be delivered at Mayo Landing over the snow and every team available in Dawson has been requisitioned to assist in transportation. The Treadwell Yukon properties are hauling with caterpillar tractors with success. It is stated that a trip

body of ore has been opened up on the Treadwell-Yukon lode, the report being that the vein has widened to 28 feet at the 200-foot level. Last fall on the same level a 10-foot vein was being worked, containing 300 ounces of silver to the ton with a little lead. If the rich ore continues to the 400-foot level it is proposed installing a concentrator next year. There also are reports of remarkable showings in the Shamrock Mine, while the Yukon Gold Company is said to have opened a new vein on the Roulette Claim.

EXPLORATIONS IN PEACE RIVER DISTRICT.— Indications that point to the possibility of the existence of oil in the Peace River District are reported by engineers who have been exploring the territory for the British Columbia Department of Lands. It is stated that the geological formations would lead to the expectation of finding oil, while in drilling operations coal seams were struck and natural gas flows tapped.

Examination of the Peace River District has been under way since 1919. The area covered lies between the Peace River on the south and Graham River on the north, and comprised 400 square miles.

A general reconnaissance was made by the late Prof. J. C. Gwillim in 1919, who recommended detailed explorations of certain sections. Prof. E. Spieker, of the John Hopkins University, was employed in the following year to report of the section to the south of the Peace River. That lying to the north of the river was examined by John A. Dresser, consulting geologist of Montreal, and Prof. Alexander McLean, of the University of Toronto.

Drilling operations were started in June 1921. Diamond drills were used and the cores of six borings, ranging from 1,027 to 2,525 feet in depth, show three distinct geological formations. They are the Dunvegan, St. John and Bullhead. Of these the St. John formation is regarded as the more important, being of marine origin and a possible oil-bearing stratum. This underlies parts of both British Columbia and the Province of Alberta. From the different borings, it is stated, saline water, inflammable gas, and thin films of oil were obtained. The gas from one of the holes was piped to the drillers' camp where it was used for heating purposes.

The most satisfactory results were obtained from Hole No. 6, which was drilled about nine miles from Hudson's Hope. It went to a depth of 2,525 feet and passed through about 1875 feet of St. John shale. A seam of sand resembling the tar sands of Alberta was encountered at depth. This was about two feet in thickness and contained a high percentage of oil having a paraffin base.

Advertisements other than "Employment Wanted" or "Employees Wanted" will be inserted in this department at the rate of 20 cents per agate line (14 agate lines make one inch). $2.80 per inch, each insertion, payable in advance. Space measured from rule to rule. When four or more consecutive insertions of the same advertisement are ordered a discount of 25 per cent. will be allowed.

Advertisements of "Wanted Employment" or "Wanted Employees" will be inserted at the rate of two cents a word, net. Cash must accompany order. If box number is used, enclose ten cents extra for postage in forwarding replies. Minimum charge 50 cents.

FOR SALE: — Felspar property situated in Eastern Ontario adjacent to the I. B. N. O. Railway about one mile from public siding. Government assay shows good commercial spar. Willing to form small company to operate this property. Apply J. Grigor, 420 Manning Ave., Toronto.

INDEX TO MINE AND MILL SUPPLIES

Addresses of advertisers whose names appear in the following classified index, may be found upon reference to their advertisements. An alphabetical index to advertisers will be found on the page facing the inside back cover. The following regulations apply to all advertisers;—One-eighth page, every issue, three headings; one-quarter page, every issue, six headings; one half page, every issue, six headings; one half page, every issue, twelve headings; full page, every issue, twenty-four headings. Buyers who are unable to find in the classification heregiven such machinery or supplies as they desire are invitedto write Service Dept., Canadian Mining Journal, Gardenvale, Que., who can in all probability, refer them to proper sources.

Acetylene Gas:
Pres-O-Lite Co. of Canada, Ltd

Agitators:
The Dorr Co.
Horton Steel Works, Limited.

Air Compressors:
Belliss & Morcom Ltd.
Canadian Ingersoll-Rand Co., Ltd
Denver Rock Drill Mfg. Co., Ltd.
Herbert, Alfred, Limited
Holman Bros., Ltd.
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Hull Iron & Steel Foundries, Ltd.
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The William Kennedy & Sons, Ltd.

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Mine & Smelter Supply.

Ball Mill Feeders:
Herbert, Alfred, Limited.
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Canadian Steel Foundries, Ltd
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Mine & Smelter Supply.

Balances — Assay & Analytical:
Mine & Smelter Supply.
The William Kennedy & Sons, Ltd.

Belting — Leather, Rubber & Cotton:
Canadian Link-Belt Co., Ltd.
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Belting:
Gutta Percha & Rubber, Ltd.

Belting — Silent Chain:
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Hans Renold of Canada, Ltd.,
Jones & Glassco (Regd.).

Belting (Conveyor):
Gutta Percha & Rubber, Ltd.
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Can. Chicago Bridge & Iron Co., Ltd
Horton Steel Works, Ltd.

Bluestone:
The Consol'd Mining & Smelting Co.

Boilers:
The William Kennedy & Sons, Ltd

Boxes, Cable Junction:
Standard Underground Cable Co. of Canada, Ltd.
Northern Electric Co., Ltd.

Buggies, Mine Car (Steel):
Hendrick Manufacturing Co.
Herbert, Alfred, Limited.
Holman Bros., Ltd.

Brazilian Ballas:
Diamond Drill Carbon Co.

Brick:
Wettlaufer Bros.

Bronze, Manganese, Perforated & Plain:
Hendrick Manufacturing Co.

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The William Kennedy & Sons, Ltd.
Peacock Bros., Ltd.

Bucket Lips:
Canadian Steel Foundries, Ltd

Cable — Aerial and Underground:
Canada Wire & Cable Co.
Standard Underground Cable Co. of Canada, Ltd.
Peacock Brothers, Limited.

A MERRY CHRISTMAS

At the present day, when our thoughts are all running after the precious metals, it is well to bear in mind that iron is still the most precious of all metals for the comfort and progress of mankind.— R. G. Leckie — 1897

A PROMISING IRON ORE DEPOSIT

One of the few alternatives at present available for the establishing of an iron ore industry in Canada is the concentration of low-grade magnetic ore and subsequent agglomeration of the fine particles of pure magnetite. One attempt to apply this process of beneficiation made at Moose Mountain, near Sudbury, Ontario, has so far failed of commercial success, though there is still hope that the Grondal briquettes that are made there, or perhaps sinter made by slightly modifying the process, may bring into the market the 25 million tons or more of iron ore that have been blocked out there. There may be, however, more favourable localities in Ontario for the establishing of a large scale concentration plant for magnetic ore.

One of the principal items of cost against the iron ore used in the blast-furnaces of Ontario is railway freight. If Canadian iron ore could be produced in such a locality as to carry a minimum of railway freight charge against it, the chances of commercial success would be much enhanced. Such a deposit of ore is that on the Mattawin iron range, where it touches the main line of the Canadian National Railway, fifty miles west of Port Arthur.

Today we print a description of this portion of the Mattawin range by Mr. Frank Hille, who has been principally responsible for the exploration that has been done on the lands he describes. His data show a deposit of ore of first rate proportions, sufficient for the adequate supply for an indefinite period of the largest concentrating plant that could possibly be contemplated. As with the ore on which the new plant at Babbitt, Minnesota, is now operating, part of the ore is amenable to complete separation from the associated silica without fine crushing; that is, the silica is in part inter-banded, while in other places it is intimately intermingled with the particles of iron oxide. The tenor of the ore in iron is noticeably higher than the Babbitt ore, and it is equally free from sulphur and phosphorus.

It is the location of this deposit of iron ore, however, that makes it of such promise. The only investment needed for railway facilities is for private sidings. The distance to Port Arthur, fifty miles, is from one-half to one-quarter of that necessary for ore on the American side. The quantity of ore available by quarrying, above the railway level, is stupendous.

Pending the result of the experiment at Babbitt, it is not at all likely that any concentrating plant on the same or a similar model will be erected in Canada. Should the result at Babbitt be commercial success, there is no doubt that Canada will soon have a similar plant. Such a plant should be located at the place where nature offers the best inducements and where the least investment is necessary. It may be that the Mattawin range offers these inducements.

A GOOD SPECULATIVE INVESTMENT

This week we have the pleasant duty of commenting once more upon a straightforward and well-conceived mining stock flotation. The Night Hawk Peninsular Mines, Limited, have offered for public subscription at par (one dollar) 300,000 shares of capital stock, out of an authorized issue of $5,000,000. The proceeds of this issue are to be used for the erection of a mill, and to pursue development work underground until the mill shall be a source of income.

Even in the newspaper advertisements, the information given as to properties, ore reserves and hopes for the future are well within the limits that would be prescribed by a well-informed mining engineer. We would judge that such an engineer has scrutinized the advertising "copy" before it was issued for publication. This is as it should be.

The two Canadian representatives on the board of directors provide ample security for the *bona fides* of this new gold mining company. They are no mere dummies, whose names might be used to influence the unwary or ignorant. Mr. Grover is a well known lawyer who has for years past specialized in practice connected directly with the mining industry where it is at its soundest and best. Mr. Taylor represents a firm of financial brokers whose reputation is unimpeachable. It is a pleasure to find that these representatives of the legal and financial professions have stood sponsors for a speculation in mining that is at least on a par with any other sound speculative investment.

BETTER BUSINESS TRAINING FOR ENGINEERS

Today we print a brief announcement from the Carnegie Institute of Technology, Pittsburgh, of an investigation carried on by two of their staff. The result is to show that 67 per cent. of the Carnegie Tech. graduates from 1908 to 1921, in all branches of engineering, are engaged in managerial or commercial work, as distinguished from technical employment. To meet this condition, Carnegie Tech. has instituted a separate course in Commercial Engineering.

There is no doubt that a similar investigation among Canadian engineering graduates would disclose much the same state of affairs. Those who are responsible for shaping the courses in our engineering schools are at least dimly aware of the facts of the case, but the action they have taken to meet the need indicates that their comprehension of the facts is very dim indeed. A little more English, a hurried glance at economics, and some brief references to finance and management by the technical mentors, comprises what the average engineering graduate in Canada gets today to prepare him for the managerial and commercial duties he is more than likely to assume before he has advanced far in his profession.

There is no doubt that the average college courses is already too congested, as well as too diffuse, to allow of additional studies on management and commerce. On the other hand, there is no doubt that most technical graduates are in this respect ill prepared for their life's work; they must "pick up" information and ideas on these all-important phases. If their teachers were well versed in the economics of business and in industrial management, there is no doubt that the spirit of the director or manager would pervade all their teaching, without formal instruction. This may be the way out. In any case, we are confident that the problem needs but to be faced squarely by our educationists, and an adequate solution will be found.

RESEARCH

It is a sick world that we are living in. It would be a very much sicker world if doctrinarians had their way. We confess to an impatient distaste to much that is written and spoken, by men who should know better, recommending curative measures.

The world's malady is not mortal. Weakness and fever are the unavoidable results of the phlebotomy of war.

It is good to hear commonsense from high quarters. Sir Auckland Geddes, British Ambassador to the United States, speaking recently at the University of Pennsylvania, referred thus to the world-wide need for research:—"As one looks round the world to-day and "sees in country after country the power, the direction "of force, passing from the hands of the people that "have long held that power, sees wealth being des-"troyed, sees all the surplus margin of wealth dis-"appear, one realizes that there is cause to take steps "to spread the appreciation of research, so that no "shift of political power can possibly take place that "will not leave that power in the hands of those who "at least understand something of the importance of "research, *which has to be supported because it can "never be self-supporting.*"

The italics are our own. The sentence italicized is well worth keeping in mind. It requires supplementing, however, by the statement that research to-day, whether conducted by governments, universities, or manufacturing firms, although it is not directly self-supporting, yet pays for itself a hundred-fold.

Scientific and industrial research is the corner-stone on which the edifice of Canada's prosperity must be built if it is to be architecturally sound.

A BOUNTY ON PEAT

An interesting development in the peat situation is the announcement by Premier Taschereau that the Quebec government is prepared to pay a bounty on peat fuel produced in the province. The amount of the bounty has not been announced; but no doubt it will be made sufficient to ensure commercial peat manufacture in the immediate future.

A more interesting phase of the situation is the effect on peat production in Ontario, where it is most needed. The Ontario government has spent a large sum of money in developing the present effective mechanism for making peat fuel. Now, by an astute move, the Quebec government seems about to reap the benefit of this experimental work for its own people. Whether or not the Ontario government will counter by offering a similar bounty for the manufacture of peat in Ontario, remains to be seen.

Any active measure that will provide against the domestic fuel shortage that will surely come if the strike arranged for next spring takes place, is well worth considering. It would be calamitous were the fruits of the labour and investment on peat during recent years not made use of fully during next summer

JOHN DAVID MACKENZIE

On Friday, December fifteenth, John David Mackenzie, chief of the British Columbia division of the Dominion Geological Survey, died at the military hospital at Ste. Anne's, near Montreal. After finishing his field work for the season, Dr. Mackenzie came east to this central military hospital to undergo a course of treatment of a wound he received on active service. The first of what was to have been a series of slight operations proved fatal. His wife was with

him throughout, and his friend and chief, Dr. Charles Camsell, spent the last few hours at his side. Canada has lost a brilliant son, the Empire, a good soldier, and the mining fraternity, a member who had already endeared himself to a host of friends. A simple funeral service, conducted by a fellow-soldier, likewise from Cape Breton, was attended by a circle of friends in Montreal, with the addition of some from Ottawa. The burial will take place in Vancouver.

The Canadian Mining Journal offers its sympathy to the widow, and to the surviving members of Dr. Mackenzie's family.

EDITORIAL NOTES

In discussing the questions of unemployment and migration in a recent issue the *Mining Journal* of London says: "History has shown us over and over "again that rich mining discoveries will bring emi- "grants to any part of the Empire. If Australia could "find a new gold field there would be no need of "emigration schemes." Canada has now just such a new gold field, in the midst of a vast tract of agricultural land that promises to make a huge and continuous contribution to our national agricultural wealth when it shall have been cleared and tilled.

The expected rise in metal prices in the United States, due to the new tariff schedule, has taken place promptly. The Fordney tariff has not affected seriously the production of Canadian minerals, nor is any such tariff likely to do so. A more likely effect is to stimulate the full use of Canadian minerals in Canada, and the export of the more valuable manufactured products. In the long run, the high tariff will mean a higher cost of living, and consequent higher cost of production in the United States, which will give Canada an advantage in competing for overseas trade. This might even, indeed, make the American market more attractive, and so nullify the express purpose of the high tariff.

The nickel industry, though not yet booming, is in a state of activity that is very encouraging, and indeed highly satisfactory considering the conditions that have prevailed until recently. The faith of those responsible for the direction of the industry, and their energetic efforts to convert that faith into "works," is now fully justified. Canada's ability to pay her debts abroad and to finance new development at home will be enhanced not a little during the coming years by virtue of her prosperous nickel industry.

One seldom hears of mining in Saskatchewan. Yet there are mines there, in the lignite seams, that flourish by seasons and are no great drain on the resources of the owners when they are idle. If haply there should be devised some process for converting lignite into coke, with oil, tar and ammonium sulphate as by-products and plenty of surplus gas wherewith to generate electric power, then we shall hear much more of Saskatchewan's mineral wealth. Meantime the northern half of the province, which is underlain by rocks of pre-Cambrian age, remains virtually unexplored and awaits the work of the prospector, and after him the builder of railways, to yield its quota of natural wealth for human use.

It is a highly satisfactory development in the power situation in Northern Ontario that arrangements have been made to develop an additional amount of power at Indian Chutes on the Montreal River, sixty miles to the southeast of the Porcupine camp. The financial auspices under which this newer development is being made are such as to ensure thorough and expeditious engineering work in the construction, and sound financial arrangements in power contracts. The maximum of power obtainable from this source is, however, quite insufficient for the needs, present and prospective, of the Porcupine camp, and the duty of providing for this power still presses upon the provincial authorities, in whose control the water right is still vested.

The whimsical account of George Du Maurier's "Recollection of an English Gold Mine" dug up by Mr. Murray and described by him in this issue, will be considered by many as typical of mining finance. It is so in too many cases. The habits of some mining stock promoters of sixty years ago are the same as certain of those today. Fortunately, it is becoming harder and harder to "pull off" an illicit stock flotation as time goes on. There are now a number of agencies at work on behalf of the investing public. The public press (or the most reputably part of it) is awakening to a sense of its responsibility to its readers, and a number of publishers have discovered that to associate in any way with mining frauds is a short-sighted policy. It is likewise highly satisfactory to note the discriminating interest that is being taken by a number of sound brokerage houses in legitimate mining ventures.

ADJURATION
TO
MR. C. M. CAMPBELL.

Dear Mr. Campbell, haste your armour buckle,
For your opponent, Mickle, is a mickle!
Round One is his, you almost take the count
And with your silence his belief will mount
That you are beaten, done completely [illegible]
Your dialectic fame for e'er diminished
Because your choice of sides involves some support
You must by no means take a chance at opposing
So waken, Brother Campbell! [illegible]
Us if you prove a mickle is a mickle!

F. C. M.

"Recollections of an English Gold Mine"

I had not known, until I happened to open an old volume of that sterling and long defunct periodical, *Once a Week*, that the gifted and whimiscal George du Maurier had ever had anything to do with mining. Apparently he had, for in *Once a Week*, September 21st., 1861, appears a short story written and illustrated by him and entitled "Recollections of an English Gold Mine."

From internal evidence I gather that du Maurier is the hero of the story himself. Of this, however, I am not sure. In any case, the narrative is written in the first person singular and there are intimate touches throughout that seem to indicate that the story is a transcription from real life.

The story opens in the year 1855, when, according to the author, the gold fever had been imported from Australia into England and was raging with "unmitigated violence." Rumours of rich discoveries in certain parts of England were rife. London was all excitement. Our hero caught the fever, but was cured of it by his hard-headed father. At the same time his father set him up as an analytical chemist, and equipped a laboratory for him quite regardless of expense. All that was needed now was clients.

After a few months of waiting the hoped-for happened. Somebody introduced our hero to somebody else, who, in turn, introduced him to the Chairman of the Victoria Gold and Copper Mine situated near Moleville, in Blankshire. The mine was in a bad way. £6000 had been spent on it without result so far as gold was concerned. There was ample copper, but copper had lost its charm. Two celebrated chemists had never failed to find gold in samples of the ore, but there were no corresponding returns from the amalgamating devices in use at the mine. "There was a mystery about "this which was solved by the matter-of-fact instinct "of my dear papa, in a way so very uncomplimentary "to some person or persons unknown, that I really "think it better not to say anything further on the "subject."

The young man was asked to assay a sample of ore for the Victoria company. This he did, and here is du Maurier's somewhat naïve description of the process of assaying:—"The sample was most conscientiously "analyzed: crushed into fine powder, I recollect, "triturated with quicksilver in a small machine in-"vented by Mr. Perkes, an American ...The quick-"silver was carefully and decorously distilled, and left "a small residuum which was fused with litharge, and "afterwards melted again in a beautiful little white "thing called a cupel; and the result was a most "surprising button of pure gold, sufficiently large in "proportion to the matrix ... to encourage the most "sanguine hopes."

The now enthusiastic assayer reported the good news to the Chairman, but found that the latter was not at all surprised. It was then arranged that the young man pay a professional visit to the mine. His fee, agreed upon after some debate, was at the fabulous rate of a guinea a day and half a guinea for expenses. He travelled to Moleville with the company's mining engineer. "We walked from Moleville to the mine ... " and suddenly the first mine which I, a mining "engineer of some standing, had ever beheld, burst upon my view." There he was left in authority over twenty or thirty "Shaggy, rough-looking miners." The first signs of insubordination were met by our hero "with one or two acts of summary justice (which I "will spare the reader, but which, emanating from me, "caused me unlimited astonishment)."

He found that a large edition of the Perkes amalgamating machine had been "working indefatigably "night and day, and on the very morning I got there, " the last ton was disporting itself in the machine, "impalpably pulverized with mercury, and was running "off with the water in a kind of clear, red mud, "having of course left all its gold behind it." After fining two men half-a-crown apiece for grinning when he took his razor strop out of his carpet bag, he was a beardless youth, he stopped the Perkes machine, drew off the mercury, put it in a retort, luted on the cover, and "stamped the luting secretly in two places " with a crooked six-pence, to prevent mischief."

The gold obtained proved that the ore averaged about one penny to the ton. The youth informed his employer of this in a laconic note. In reply, the Chairman reproved him for the tone of his letter and requested him to stay on indefinitely for the purpose of conducting further experiments. The young man consented cheerfully to do this. Meanwhile another wonderful amalgamating device, the invention of a retired army officer, had arrived on the scene. "I will "not attempt to describe the marvellous piece of "mechanism which had emanated from the depth of "the military gentleman's consciousness; but merely "state that it turned out to be a perfect Irish bull of " a machine." At this stage of the game the miners themselves began to see the joke. "The miners did not "believe in the mine, and as they perceived that I did "not either, they believed in me to a most flattering "extent. Indeed, I soon got very much attached to "the fellows, and used to tell them long stories about "foreign lands... and enlighten them on various "subjects on which I felt their ignorance to be equal "to, or greater than, my own ... My letters home con-"tained descriptions and sketches of them, and mama "became interested in their spiritual welfare."

The youthful mining expert had the time of his life for about a month. Festive evenings were spent at delightful old inns; pretty girls were flirted with; and he did much entertaining at his own hotel, "with "an elegant hospitality which exalted our jovial good "fellowship into the most sentimental affection towards "the small hours of the night."

But good times were drawing to a close. The directors, with their wives and daughters, decided to pay a visit to the mine. They came. All was prepared for them. Several of the miners had gone so far as to wash their faces. The mine captain had put on a new yellow waistcoat. The military gentleman's machine "revolved on itself in a charmingly symmetrical man-"ner." The visitors arrived. "They inspected every-"thing with the eye of a hawk. They too, since I had "left them, had made themselves thoroughly proficient "in those technical terms without which no science can "ever rest on a solid basis; but occasionally applied "them in a careless manner, I must say."

An hour's inspection so exhausted the party that refreshment was imperative. Hampers were unpacked, champagne flowed, the assayer sang Tyrolese ditties,

and two young ladies warbled "Excelsior." Eventually the assayer was packed into one of the empty hampers and driven to his hotel in state. A warm evening ensued, in the course of which the assayer was given a hint by the Chairman to the effect that it would pay him to speak favorably of the mine. He was further instructed to prepare "a clever matter-of-"fact report." Next morning some of the directors made their breakfast entirely off soda-water. By the time our hero had finished *his* soda-water, the carriages were at the door. It was understood that the assayer was to follow the party to London and bring his report with him.

His good-bye to his men was very affecting. "One "gave me a tobacco pouch, another a short black pipe, "which I determined not to use till age had made my "constitution stronger. The captain presented me "with a small Testament,...even Hodge, who was the "poorest of the poor, pressed upon my acceptance a "beautiful dead snake, which emitted a very powerful "odour."

Next morning he was in London under the paternal roof. A shareholders meeting was to be held in a week's time. He therefore, with his father's assistance, set about compiling a report. This he mailed to the Chairman. It was returned with a suggestion that the addition of a little fiction would do no harm. Very discreetly our assayer wrote back again enclosing the report and stating that he would do justice to the occasion in an *extempore* speech. And he kept his promise. In a shockingly candid impromptu address he said pretty nearly everything that the Chairman did not wish him to say. He touched upon the military gentleman's machine in these words:—"An instru-"ment, in short, which revolved on its axis for nearly "a month, with a persistency that was quite pathetic; "but in spite of its great merit, it was not exactly "calculated to find a mineral which did not exist, and "it failed to do so, probably owing to that very cause." This was enough for the shareholders. Our assayer was paid his fee, the company was wound up, and a new company made handsome dividends from working the mine for copper.

The story concludes:—

"**QUERY**: How did the gold get into the samples?

"**MORAL**: The mysteries of science are inscrutable to the uninitiated mind."

J. C. MURRAY.

MICA IN GUATEMALA

In view of Canada's important position in the production of mica, a U. S. consular report from Guatemala, Central America, is of interest. As a result of development work now in progress, Guatemala, although at present a small producer of mica, may become an important exporter of this mineral. The United States requires four times the mica it produces, and Guatemala should readily find in the United States a market for all that it can export in the future. There are to-day four mines open and operating, all under American control, a fifth mine will be opened within a month or two, and two more mines are expected to be operating before the end of the year. Present production is at the rate of 600 to 1,000 pounds per month, being about 40 per cent. cut mica and 60 per cent. rough trimmed, all of which is being shipped to the United States.

TECHNICAL GRADUATES NEED COMMERCIAL TRAINING

That engineering college graduates are handicapped without a supplementary commercial training is the conclusion of research investigations just completed by Dr. W. F. Rittman and W. F. Reilly, of Carnegie Institute of Technology, Pittsburgh. In the Carnegie Technical Journal, a quarterly publication of the alumni and students of Carnegie Tech, Messrs. Rittman and Reilly present substantial proof of the need of commercial training in Technological college courses.

With the cooperation of the Alumni Office, a study of the present occupations of Carnegie Tech. graduates was made. Of the graduates from 1908 to 1921, the investigations showed that approximately 67 per cent of the total engineering graduates are now engaged in Commercial or Managerial Work. This majority becomes significant in consideration of the fact that "engineering" graduates include a wide range of highly technical fields such as Mechanical, Electrical, Civil, Chemical, Metallurgical, Mining, Sanitary, and Science.

An interesting tabulation in the report shows the following percentages of engineering graduates in all departments who are now in Commercial or Managerial capacities: Mechanical Engineering, 65 per cent; Electrical Engineering, 60 per cent; Civil Engineering, 73 per cent; Chemical Engineering, 59 per cent; Commercial Engineering, 91 per cent; Metallurgical and Mining Engineering, 67 per cent; Sanitary Engineering, 60 per cent; Science, 77 per cent.

One of the two most important generalizations cited by the authors in their report is that "the great majority of graduates use their technical education as a means of getting into commercial or managerial work. It is believed that a similar study of the activities of the graduates of other technical institutions corresponding to Carnegie Institute of Technology would show this same order of classification, which seems to be natural and in conformity with the trend of the times."

Carnegie Tech. was one of the first technical institutions to incorporate a separate Commercial Engineering Course in its College of Engineering. Its foresight in anticipating the demands of industry for college graduates with supplementary business training is apparently substantiated by the research investigations of Messrs. Rittman and Reilly.

With the loss of coal lands in Silesia and when held by France on the product of the Ruhr basin, Germany's fuel resources are taxed to the utmost. One of her most important resources is lignite, or brown coal, which is very extensively used. Much of it is used in the raw form as domestic fuel. A growing proportion is, however, being treated by distillation to give gas, oils of various sorts and coke of a good quality, which is used in the manufacture of [illegible] comes from the retorts, without briquetting. Most of the lignite beds contain only a very small amount of [illegible] Many are worked as quarries and [illegible]

Kirby Thomas, of New York, [illegible] be engaged for some time [illegible] district in connection with the [illegible] exploration work the [illegible] interests.

The Mattawin Iron Range

A Description of its Eastern End, the character of the Ore, and its Possible Utilization

By F. HILLE, M.E.

When a number of years ago a Swedish savant endeavoured to give us, in an interesting statistical paper, a summary of what iron ore reserves the world in general, and each nation in particular, possesses, a certain chill of embarrassment went through the industrial world when it read and studied the comparatively small amount that each country was said to have at its disposal of ore of such grades as could be used economically directly from the mines to the smelters. Each nation, especially the large industrial and commercial ones, looked eagerly about and took stock of what tonnage they had still available for present and future use.

The United States Geological Survey busied itself, figured and estimated every known iron range and deposit of the land; the result was a considerable amount on which they claimed the American people could depend. However, in these figures were included not only the so-called high-grade ores, ranging from 55% iron content and over, but also those of much lower percentage. Of course that was, from a patriotic point of view, perhaps laudable, but considered from the view point of political economy, not very practical, because it lulled the nation into a sense of security which, from the present industrial standpoint, was not exactly justifiable. This question and the argument that followed did bear fruit to the advantage of everyone concerned, because attention was then paid, not only to the higher grade ores, but also to such ores as appeared even a short time ago too inferior for present practicable use. This move had another good result, in that men's ingenuity was brought into play and new processes invented by which the immense quantities of low-grade ores, of almost every composition and natural characteristics, were brought into use, but principally the low-grade magnetites, owing to their ready adaptability to a process of separation of their iron particles from their impurities. The magnetic properties of their iron particles gave a ready clue to the simplest and cheapest method by which they could be treated.

Canada's Vast Supply of Magnetite

Canada, especially, is well supplied with this class of ore, and shares with Sweden and Norway the first rank as to quantity. Sweden and Norway have beaten us in the race for practical use of these ores and have been, on this account, vastly benefitted, not only by their utilization in their own industries, but by bringing the improved ores into the market in the European iron centres, where they are established now as a "sine qua non."

In the last few years we have, here on this continent, commenced at last to consider more seriously our own resources of this variety of ore and have begun to make use of this, one our principal assets. Here in Canada, however, we have not yet progressed to the degree to which the lack of other iron ores should have compelled us.

Now, there is no denying that the smelting of high-grade ores is much more economical than the smelting of those of lower grade, especially, if the latter have to be transported long distances from the mines to the smelters. If, then, the processes that produce a high-grade ore such as concentrates or briquettes are economical, that is if the extra value of the higher product will balance the transportation and the additional smelting expenses of the run-of-mine ores, then this of itself would justify the erection of plants in which to improve these low-grade ores. The processes for improving this class of ore are now so well established, and the magnetic ores of Western Ontario are so amenable to them, that only lack of experience or sheer negligence would cause such enterprises to fail.

The Mattawin Range

There are many localities in Western Ontario where these ores occur, but I shall confine myself in this report exclusively to a locality that offers so many advantages that I have chosen it as a prospective starting point for an industry that will be a benefit, not only to this country, but to all those that are deficient in iron ore resources, and not only for the present, but also for coming generations.

The locality to which I refer is a part of the so-called Mattawin Iron Range. The magnetite deposits occurring there form an almost compact mass of ore, over 1,400 feet in width and several miles in length, with a depth that the diamond drill had not penetrated at 1,000 feet. According to stratigraphical data, the full depth would be 11,200 feet, and our Geological Survey came to almost the same conclusion, estimating the depth to be between 10,000 and 12,000 feet. However, I like to be conservative, and desire that my readers may find my assertions more than borne out by the proven facts. Let us, therefore, halve these figures and take 5,000 feet as the depth, and even then by calculating the cubic contents of these deposits, and multiplying them by the specific gravity of the ore, we arrive at a figure that staggers the imagination. I hold that it is a duty of our iron masters to bring into industrial use this ore, before the present resources of high-grade ore, which are comparatively meagre, shall have been exhausted.

The province of Ontario alone is able to supply much more than the full requirement of iron ore for Canada. It remains but to "take the bull by the horns," develop the deposits, concentrate and agglomerate the ores, and ship them to furnaces already ready and willing to accept such high-grade material.

Situation and Physical Features of Mattawin Range

The deposit, to which I have made reference above, commences in the neighbourhood of the 48 mile post west of Port Arthur on the Canadian National Railway, and continues almost uninterrupted to the 51 mile post, a distance of about three miles, embracing an area of about 960 acres. The locality is easy of access because the above named railway passes right through the properties. They are therefore, not farther from a harbour on Lake Superior than the distance named. The highest elevation of the hills, upon

which the greater bulk of the ore is situated, is from 300 to 350 feet above the railway. This is true in general from the 49 miles post to the 51 mile post and westward; from the 49 mile post east for one mile, a valley intervenes, and then the hills resume.

Water for milling purposes is available by gravity from a number of small streams that cross the property. Water power to the extent of 1,000 to 1,500 horsepower is available on the Mattawin River close to the property, and a larger power is available on the Shebandawan River, to the northwest.

Geology of the Range

The rocks constituting the Mattawin Range are a remnant of our earth's first crust, laid down in Keewatin times, now folded into anticlines and synclines and metamorphosed into chlorite, hornblende and micaceous schists. In pre-Cambrian times eruptive rocks intruded the foregoing, these being principally diorites and gabbros and in places diabase, the youngest rock of the region.

These pre-Cambrian intrusive rocks had a certain influence upon the ore deposits, which were deposited as carbonates, but were changed by the heat of the eruptive rocks, according to the intensity of the heat that reached the ores, either into magnetite or martite, or into a mixture of hematite and magnetite, as is the case in some deposits along the Shebandowan River. The principal intrusion of pre-Cambrian rocks occurred north of the Mattawin River along a line of weakness.

Character of the Ore

Under this head we have to consider the special characteristics of the ore, a study of which is necessary for its present as well as future treatment.

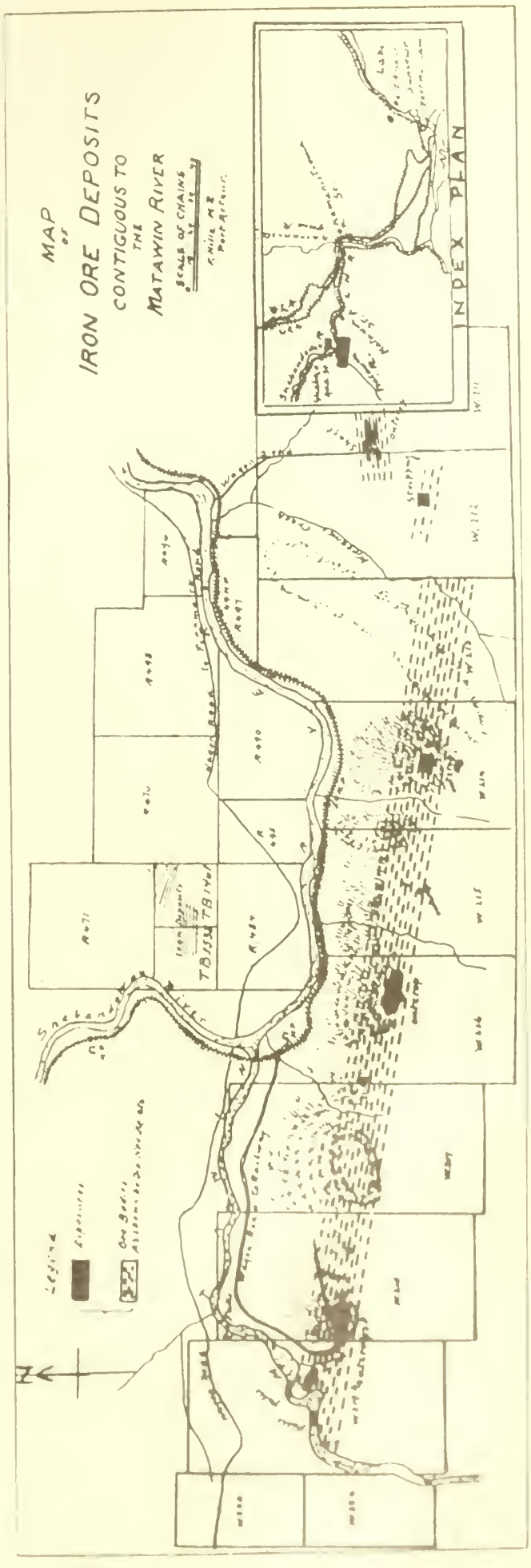
Exploration has shown that the ore on claims W. 211, 212, 213, 214, 215 and 216 (see accompanying map) is magnetite of two principal compositions.

1.—One of banded structure, that is, one in which bands of jasper alternate with bands of high grade magnetite.

2.—Second, in which the impurities (mainly silica) and iron oxide particles are intimately mixed.

The ores of the first class are solid and compact, and only where a lateral pressure was exerted upon them did they receive a somewhat schistose structure, and whenever this is so, the bands of iron and jasper are easily detached from each other by crushing. The iron bands show usually a steel blue color and are rich in iron, often from 58 to 60% and more. The jasper bands, on the other hand, show different colors in different localities, bluish and grey being prevalent, a bright red at a few places, and, where this is the case, the ore has usually undergone intense pressure and heat, the latter being sometimes so great that the ore was converted into a viscous mass, that shows how by bands twisted in every conceivable shape and figure. This interesting phenomenon can be well observed on a large deposit on W. 211. The magnetism of this ore as shown by a survey is remarkable and the change from positive into negative is intense and abrupt. It is a very fine ore for concentration.

The average iron content of the banded ore lies between 35 and 45 per cent. A typical sample of this class of ore, coming from the north side of the Mattawin River, from the same deposit that also crops out on claims T. B. 1538 and 1461, gave the following result:



Iron	38.90%
Silica	44. %
Phosphorus	0.13%
Sulphur	0.03%

Its iron bands alone gave:

Iron	60.60%
Silica	15.26%
Phosphorus	0.18%
Sulphur	0.05%

The second class of ore is as massive as the former just described, but instead of being banded, the impurities (mainly silica) are intimately mixed with the iron oxide particles. To separate these it is necessary to break and grind this ore to such a fineness as to liberate them from each other.

The average iron content of this ore lies between 30 and 38%; some deposits will give even a higher percentage. The western outcrops on claim W. 216 will average about 36%. The southern part on W. 214 and 215 will run about the same, especially when taken from pits or other points below the surface. If, however, the sample is taken from the surface, we find an impoverished ore from which a part of the iron has been dissolved out by moisture in combination with humic acids derived from the overlying vegetable matter. This loss amounts sometimes to 5 to 10% iron; however, one shot into the surface will change these conditions, as we find to be the case with the same deposit on the east side of W. 216 where, owing to the dissolution of the iron, the silica was increased by nearly 10%. I draw special attention to this occurrence, so that every phase of the nature of these iron deposits may be rightly understood.

To view the ore from every point I shall now cite some general analysis of the Mattawin ores and some partial tests.

The first is a general analysis of a surface ore from the large outcrop on the eastern side of W. 216; the second is a complete test of that portion situated a little farther west, where the ore was taken from a shallow pit.

	No. 1 (Surface)	No. 2 (Pit)
FeO	12.28%	13.39%
Fe_2O_3	21.70%	34.90%
Iron	24.73%	34.82%
FeS_2	0.33%	0.18%
Sulph.	0.18%	0.10%
MnO	0.21%	0.70%
Mang.	0.16%	0.54%
Al_2O_3	7.93%	3.10%
CaO	0.87%	1.27%
Mg.O	2.65%	2.36%
P_2O_5	0.32%	0.32%
Phosph.	0.14%	0.14%
SiO_2	51.36%	41.46%
TiO_2	0.03%	Trace
Titan.	0.02%	Trace
H_2O & CO_2	1.35%	2.87%
Na_2O & K_2O	0.97%	.....

The average of six samples taken out of some pits gave metallic iron 36.06%. Surface ore from the same place contained 24.82% metallic iron. This difference explains what I said respecting surface and pit ore.

It may be of interest to note here that the iron contents of the deposit from which No. 2 sample was taken did not decrease at depth, but, on the contrary, it increased nearly four points, since an average of 180 feet of diamond-drill core, coming from 850 feet in depth, gave 38.68% metallic iron. However, it is easily understood that, over so large an area as is covered by the ore deposit, there are places where the ore shows a lower iron content, but this is balanced by others where the ore is above the general average, as is the case with the deposit on W. 211, 214 and T. B. 1538 and 1461 and others.

I now add a complete list of all the analyses I made on Mattawin ores in the course of a number of years. The special place from where each individual sample came was not always given me, but I know positively that they came from within the limits of the deposit that is the subject of this article.

LIST OF ANALYSES

Assay No.	Iron		
1985	44.69%	2095	38.75
1986	35.64	2096	26.80
1987	37.12	2097	32.40
1988	40.81	2098	32.18
1989	35.	2099	50.60
1990	35.	2100	46.36
1991	33.54	2101	42.70
1992	30.06	2102	42.82
1993	31.20*	2103	45.62
1994	34.67*	2104	50.73
1995	31.22*	2105	57.40
1996	29.88*	2106	49.91
1997	29.58*	2107	53.40
1998	46.24*	2108	62.85
1999	35.70*	2109	55.23
2000	52.10*	2141	45.
2001	57.22*	2142	29.80
2002	34.55*	2143	34.92
2003	37.86*	2144	34.92
2004	34.55	2145	37.30
2005	31.90	2146	40.12
2006	36.62	2147	35.74
2007	36.62	2148	39.45
2008	34.22	2149	49.14
2009	35.69	2150	36.89
2010	38.80	2152	33.27
2011	34.99	2153	38.60
2012	30.34	2154	33.83
2013	34.99	2155	35.98
2037	35.15	2156	32.57
2038	34.10	2157	36.77
2039	37.10	2158	41.91
2040	33.10	2159	40.92
2041	33.10	2164	38.68**
2042	55.15	2186	35.74***
2043	44.76	2244	35.20
2044	37.97	2245	38.06
2045	32.38	2258	36.40
2046	32.38	2260	42.10
2047	29.30	2261	44.69
2048	34.15	2262	28.20
2049	47.85	2263	33.33
2087	46.70	2264	43.90
2088	34.06	2265	32.05
2089	44.07	2266	35.19
2090	37.82	2267	24.54
2091	34.30	2268	37.20
2092	30.65	2269	44.62
2093	38.84	2270	38.79
2094	42.41	Av. over all	37.72%

* Diamond drill core.

** Core from 850 ft. depth average of 180 feet.

*** Core depth not stated.

Concentration Tests

I have made a few concentrating tests of the foregoing ore. For the first I took a low grade surface ore, of the following composition, which gave concentrates, as shown in the second column:

	Raw Ore	Concentrate
Iron	24.16%	66.50%
Silica	52.07%	6.50
Phosphorus	0.14	0.008
Sulphur	0.06	0.002

This was an ore in which the iron and impurities were intimately mixed together, and yet the result was very satisfactory.

The second test was made with a higher grade of banded ore from T. B. 1461: a partial test showed the following ingredients:

Iron	38.90%
Silica	34.
Phosphorus	0.13
Sulphur	0.03

The concentrates of this ore were produced in three grades of finess, namely:—

6 parts were	60 mesh
1 part was	80 mesh
1 part was	100-200 mesh

The 60 mesh concentrate contained:

Iron	65.10%
Silica	6.50
Phosphorus	0.04

The 80 mesh concentrate contained:

Iron	67.50
Silica	4.50
Phosphorus	0.04

The 100-200 mesh concentrate contained:

Iron	69.80
Silica	2.57
Phosphorus	9.09

These few tests show that the ore has excellent properties for concentration: in every instance a high-grade Bessemer product resulted, high in iron and low in phosphorus, with hardly any sulphur. I could add the results of a few more such tests, but it would not increase the knowledge as to the amenability of the ore to concentration.

Mineralogical Characteristics of the Ore

By the two general analyses I gave above, the reader will have got a fair idea of what the run-of-mine ore consists. The principal impurity of the ore is silica, with some manganese. This latter we cannot call an impurity as it does a certain service in the furnace product. Sulphur, on the other hand, we must call an impurity, and one of the most objectionable, if it is in too large quantities in the ore; but, fortunately, the sulphide of iron in the Mattawin ores is a negligible quantity, not only on account of its insignificant amount, but also owing to the readiness with which it is eliminated by the concentration and briquetting or agglomeration process.

Somewhat different is the occurrence of the phosphorus, because sometimes it is a constituent of the iron oxide particles. Sometimes it is a mixture of a certain phosphor ore, usually apatite, and if in this state it is easily eliminated. Sometimes it is also an infiltrated product, derived through the decomposition of vegetable matter; where this is the case it soon will disappear, usually a few feet below the surface. I have found, however, that it exists in the great bulk of the ore as an independent mineral, as we may notice in the few concentrating tests I have given.

The alumina, lime and magnesia and a certain amount of the silica, are not exactly impurities, because they play various roles in the smelting process; but if left in the concentrate they would reduce the percentage of the iron. However, these disappear in the milling process.

Commercial Value of the Ore

The average grade of our Mattawin ores, high and low, as shown in the above list, is 37.72% metallic iron. This is higher than the ores which most of the iron ore concentrating plants in Europe and the newer plants in America are treating, and, I may venture to say, few, if any, possess equal facilities for mining, concentrating and shipping. Owing to the size and position of the deposits, open air mining can be substituted for underground work.

Pumping expenses would be very small, owing to the nearness of the water in large quantity; the concentrating process could be carried on automatically, thus saving labour. What wood and timber is necessary for heating and building is found on the land. The shipping facilities could not be better, because the railway skirts the deposits, and the ground is favourable for building of the railway yards, stock-bins, etc., that the handling of the ore and concentrate may be made as convenient as desired. I may again remark that the ore deposits are so large that it depends only on the capital available and the demand of the market what amount of ore is mined. That the demand for pure, high-grade ore is growing is evident, owing to the diminishing supply of the high-grade mines, and owing to the steady increase in demand for high class steels: there need, therefore, be no apprehension as regards demand.

Now, in summarizing what I have just mentioned, it should be readily understood that the value of these ores and their products may be expected to rise from year to year, and that, by the daily practice in handling these ores and converting them into marketable shape, the cost of production should diminish, especially with a constant increase of the amount worked daily.

The Concentration Process

In any discussion of magnetic concentration and the subsequent agglomeration of the fine particles of ore, due credit should be given that pioneer, Dr. Grondal. The "Grondal Magnetic Separation Process" is still in commercial use in various parts of the world, though parts of the mechanism he devised tend to be superseded by newer and more economical forms of machinery. Dr. Grondal's original arrangement of plant was simple, consisting of crushers, followed by magnetic cobbing machines, ball mills, tube mills, classifiers, magnetic concentrating machines, briquetting presses and sintering kilns. This has been somewhat modified in the new plant at Babbitt, Minnesota, with a reduction in working costs, but the result is a similar most desirable material for the blast furnace. [These plants have already been described fully on numerous occasions, and the description will not be repeated here.]

The fine concentrates are baked by these processes to a solid mass, that constitutes now a hematite ore, for the former magnetite is changed from a ferro-ferric oxide into a ferric ore, and is sent in this state to the

smelters, with a metallic iron content of from 65 to 68% containing 4 to 5% silica, with little or no phosphorus, and no sulphur.

These briquettes, or sintered ore masses, have attracted the attention of every furnace man, because the advantages over almost any natural ore are considerable. Owing to their porosity they are more easily reduced in the furnaces, which tends to a saving of fuel and time, in comparison with the natural ore. The saving of fuel may reach 15 to 17%, and there is saved also a certain amount of flux, as well as a smaller amount of slag. Also there is no cooling of the furnace through moisture in the ore.

The absence of sulphur and presence of only an insignificant amount of phosphorus is an additional advantage.

Prospective Concentration Plant

The situation of the plant should be as close to the mines as circumstances will permit. There are a number of places on the Mattawin range that offer natural advantages for building a plant, either as a gravity plant, or on a level plan, or a combination of both. Of course there are several other matters to be considered, for instance, the location for railway sidings, loading and unloading yards, station, etc. Further, the location for the worker's cottages, water and wood or other fuel supply, and last, but not least, convenient delivery of the ore into the plant.

It is mainly by considering the experience gained by established plants, that we can learn and draw our lessons as to costs of running and of establishing such enterprises. If we adapt these to our own local conditions and usages, we may arrive at a fair computation of what the cost of such a plant would be. However, I shall at this juncture not go into details, but will state here only a lump sum, and leave it rather to experts in this line to do this when the right time arrives.

The cost of a plant that treats 3,000 tons of raw ore would be in the neighbourhood of $600,000. This refers only to the building of the concentrating mill, mining plant, yards, cottages for workmen and working capital; other expenses connected with the undertaking are not included in the above sum.

To give a detailed estimate of every item that would come under the above heading would overstep the intent of this paper. I shall condense the estimate into a few figures that will serve the same purpose for the present.

We have to keep in mind that we wish to mine and treat 3,000 tons per day of an average iron content of about 35%. This would give us approximately 1,560 tons of briquettes of an iron content of 68%; the ratio of crude ore to briquette would be 1.92 to 1.

The cost of mining 1 ton of ore is	$1.013
The cost of milling 1 ton of ore is	0.820
	1.833
The cost of mining (per ton of briquettes)	1.948
The cost of 1 ton, briquetting and gen. exp.	1.576
Total cost of 1 ton briquettes	$3.52
Cost per ton of briquettes laid down in Port Arthur	4.02
Cost per ton of briquettes laid down Lake Erie ports	5.22
The base price of 55% Old Range Bessemer	6.45
The value per ton of 68% briquette	7.62
Margin of profit per ton in Port Arthur	3.60
Margin of profit per ton in Lake Erie ports	2.40

Daily profit, $3,744 and $5.616 respectively.

Of course the above figures relate to a time when the whole enterprise is in a smooth working condition, for the expenses incidental to a new industry are, at the beginning, usually unexpectedly and disproportionately high, until practical experience has taken the place of theory and experimentation.

WHY COAL IS BEING INVESIGATED

The recent revival of building operations in our cities everywhere affords visual evidence of the extent to which the huge steam shovel with its pile of coal has taken the place of human labor in excavating for the modern building. Nor is the contribution of coal in construction work all visible, for the structural materials themselves are largely the product of coal burned at mine, quarry, and furnace, at brick or cement kiln, and at the steel plant. This explains how figures recently presented before the United States Coal Commission show that about one-third of the weight of a fireproof office building as today constructed represents the tonnage of coal that was consumed in the preparation of the building materials.

It is a far cry from steel and bricks to the fruit that comes to our breakfast table, but coal is no less a component part of that fruit. The cantaloupe that is transported in a refrigerator car from an Arizona ranch to a Boston home represents an expediture of nearly two pounds of coal, or its equivalent in oil or water power, in the form of ice and locomotive fuel. And, at another season, the orange from California grove appears on the same breakfast table in Boston only by reason of a similar expenditure of over half a pound of coal. Thus, whether we get it in the form of luxuries, which so soon come to be regarded as necessities, or in the form of raw materials of industry, coal has become an essential item in the daily life of the people.

One fact, therefore, that the United States Coal Commission might feel that it does not need to establish is that coal is a necessity of modern life and the coal trade might well see in the present inquiry some ground for hoping for more stable conditions in the future. Yet, "Why pick on coal?" is the head-line of an editorial in a leading coal journal commenting on recent activities of Federal, State, and municipal agencies, and suggesting eggs, cabbages, apples, and Wilton rugs as other essential products that might not be any better able than coal to withstand the "dazzling white light of legislative research."

The long list of Congressional and other inquiries directed specifically toward the coal industry surely justifies the coal trade in regarding itself as the most "generally be-divided business organization on the face of the earth, excepting possibly the railroads." However, the increasing public interest in the subject of coal, even though chiefly reflected in public investigation, should be regarded as proof of an increasing realization of what coal means in the world of today.

At the meeting of the American Association for the Advancement of Science to be held in Boston during Christmas week, Mr. J. B. Tyrrell, one of the retiring Vice Presidents, will give an address before the Engineering Section on "Mining in Canada."

LETTERS FROM READERS

Optimistic View of B. C. Mining

The Editor, Canadian Mining Journal.

Sir,

Mr. C. M. Campbell's cheerful letter, which appeared in your issue of November 3, should have been timed to appear just before Christmas, and thus brings its glad tidings of comfort and joy to his brethern in the mining profession for the festive season.

As Mr. Campbell states, one can prove pretty nearly anything one wants to by statistics to one's own satisfaction. If the optimists of the mining profession have garbled statistics to prove their points, surely Mr. Campbell is not entirely innocent of a similar offence to prove his. He has "mussed up" a piece of perfectly good plotting-paper with curves—rather angular ones—to illustrate the growth of various industries in Canada during the last twenty years, and particularly to show that the manufacturing and agricultural industries have entirely out-raced those of mining, fishing, and forestry; but, so far as I can see, he has succeeded only in showing how kindly the Canadian manufacturer took to the gentle art of profiteering at the very commencement of the war and that, though the farmer took a year to get into into his stride, he proved an apt pulpil. If these curves had been brought to date, it would have been found that the manufacturers and agriculturists are little, if any, better off as regards production and certainly as regards profits of production than they were at the beginning of the war. All of which goes to show that statistics obtained during war-time are fairly useless during periods of peace.

The false impressions given by the curves do not end here, however. The curve that shows the output of the manufactories does not show the cost of the raw material required to produce this output, nor that a very large proportion of this raw material is imported. It fails to show, too, that the products of the factories have been, and are, fostered and pampered by a high protective tariff, while the mining industry, in most instances, has to combat foreign competition unprotected.

In another table Mr Campbell points derisively, among other items, to ten and a quarter million dollars paid in 1920 for manufactured brass and copper goods mostly rods and bars that were imported into Canada; but he fails to mention that Canada produces more copper and zinc than it can use, or that there is a copper refinery and a brass and copper rod mill idle at Trail, B. C., which if given a reasonable period of protection would be capable of turning out all the copper and brass rods and bars that Canada needs. It has not been given a period of protection, however, because there would have been a hue and cry from the manufacturers of electrical machinery and the drawers of wire—pap fed concerns that Mr. Campbell eulogizes—and from electrical transportation, telephone, and telegraph concerns, which together control a far greater number of votes than the copper producers.

In his previous letter on this subject, Mr. Campbell stated that there had not been an outstanding mineral discovery in British Columbia in a decade, and I should have thought more of the seriousness of his present letter had he referred to the development of the Premier mine. Though the actual mine was known and worked before, the immense ore-bodies at the Sullivan has been discovered only within the last ten years, as has likewise the new ore-shoot at the old Slocan Star mine.

Mr Campbell avers that our coal reserve has been over estimated, (probably it has,—Mr. J. D. Mackenzie, who has just revised the figures for Vancouver Island, shows that in this instance it has, at any rate), and that there is need for conservation of coal. There *is* consevation of our coal. The coal miners and laborers, by their exhorbitant demands in the way of wages, and the operators and dealers, by their extortionate prices, are taking care of that. They have forced the coal consumers to turn to fuel oil, wood, and electricity generated by water power. No one uses coal in British Columbia today if it is at all possible to use anything else.

Fortunately few people view the condition of the mining industry in British Columbia from Mr. Campbell's dismal outlook. The Granby company, Mr. Campbell's principal, is looking for fresh fields to conquer, and is exploring a number of properties in the Portland Canal division It is just completing a large reservior, at a cost of some $400,000, which will render it independent of fuel for power purposes. The Britannia company has nearly completed its new mill, and has made a contract with the British Columbia Electric Railway Company to provide power to operate it. This mill will cost in the neighborhood of a million dollars, and will be the largest copper ore concentrator in the British Empire. The Consolidated M and S Co. is spending something like the same amount on a new mill at its Sullivan mine, and has contracted with its East Kootenay Power Company for electricity to operate it. A New York syndicate has bonded the Le Roi No. 2 mine, at Rossland, it is said for a million and a half, and dozens of United States concerns are pouring money into the development and exploration of abandoned mines and of prospects in the Slocan, Portland Canal, Hazelton district, and other parts of British Columbia. These people are showing their optimism in the future of the mining industry of this Province in a practical way. "By their works ye shall know them."

Victoria, B. C. F. H. Mason

TARIFF AFFECTS METAL MARKET

Sufficient time has elapsed since the enactment of the new United States tariff law to enable a survey of some of the immediate effects of the new rates. In certain items in the metal group the discounting of the new tariff began a week or two before the bill was signed. In others, such discounting began after the bill was signed.

Ferrotungsten has advanced from 61 to 94 cents a pound contained in about two months; tungsten concentrates from $3. a unit to $7.50 a unit. Purchases for importation have ceased, at least temporarily. Fifty per cent ferrosilicon has advanced in price from $55 to $75, delivered. Importation of this material has ceased.

Before the tariff was enacted, 4 to 6 per cent. carbon ferrochrome was quoted 12 cents a pound contained by domestic makers and 10 cents by importers. The importers have advanced their price to 12 cents duty paid, but domestic alloy still can be bought at 12 cents. Manganese ore purchases were heavy prior to the signing of the bill, subsequently they have been lacking. The market now is nominally quoted at the old price plus the duty, in other words, 29 cents and 22 cents, totalling 51 cents.

The duty on pig lead was advanced from 2½ per cent. ad valorem to 2 1/8 cents specific. The demand in this country has been so heavy and domestic production has turned so slowly that the American market has discounted the entire increase in duty in the face of a higher world market and now is drawing supplies of Mexican lead on a 2½ cent scale.

The duty on zinc was increased from 15 per cent. ad valorem to 1 3/4 cents a pound specific. While this has given increased production to the same industry, the shortage in Europe has become so acute that there have been

heavy purchases of American zinc for export to Great Britain and the Continent. Prices both here and in London have risen to the highest levels in two years.

While no duty was imposed on copper, fabricated products have been given a protection, ranging from 2 1-8 cents on sheets and rods to 7 cents on tubes and 12 cents on brass angles and channels. Foreign competition has not been an important factor in the market and the imposition of the duties has had no immediate market effect. The antimony market discounted the full increase in the duty from 10 per cent ad valorem to 2 cents a pound specific prior to the signing of the bill and since then has eased off.

The domestic aluminum producer has made two price advances totalling 3 cents a pound since the law became effective, increasing ingot aluminum duties from 2 to 5 cents a pound. In other words the full increase in duty has been met by the market. Foreign aluminum in good sized tonnages has been sold for importation, for 1923 delivery.

In general the tariff has been an important factor in the metal markets though much of its first effects have been discounted, as was to be expected.—from "Iron Ore," Ishpeming.

Advance Summary of Coal Statistics

The mining Branch of the Dominion Bureau of Statistics has issued an advance summary of coal statistics for Canada showing the imports of anthracite and bituminous coal by grades and by provinces during the first eleven months of the present calendar year with comparative figures showing the average imports during the same period in the three years 1919-20-21. Exports of Canadian coal are also shown.

TABLE 1, IMPORTS OF ANTHRACITE COAL BY GRADES & PROVINCES

PROVINCE	EGG, NUT, ETC. (1) Total for Yr. to date 1922	EGG, NUT, ETC. (2) 3-Yr. Aver. for Period 1919-20-21	DUST (3) Total for Yr. to date 1922	DUST (4) 3-Yr. Aver. for Period 1919-20-21	(5) % of (1) to (2)	(6) % of (3) to (4)
Nova Scotia	21,237d	52,425	56	14	41.	400.
Pr. Ed. Island	3,876	6,769	.....	.....	57.	...
New Brunswick	53,332e	64,933	.....	.....	82.	...
Quebec	605,199b	1,124,647	136,952c	186,945	54.	73.
Ontario - Central	1,296,156a	2,591,167	101,002	61,680	50.	164.
Head of Lakes	21,986	309,956	.....	.....	7.	...
Manitoba	10,238	14,986	3,740	2,539	68.	147.
Saskatchewan	111	97	120	.....	114.	...
Alberta	.....	157	.....	59	...	...
British Columbia	34	153	1	1	22.	100.
Yukon	.....	.....	.....	.....	...	...
TOTAL	2,012,169	4,165,290	241,871	251,238	48.	96.

TABLE 2, IMPORTS OF BITUMINOUS COAL BY GRADES & BY PROVINCES

PROVINCE	ROUND AND RUN OF MINE (1) Total for Yr. to date 1922	ROUND AND RUN OF MINE (2) 3-Yr. Aver. for Period 1919-20-21	SLACK (3) Total for Yr. to date 1922	SLACK (4) 3-Yr. Aver. for Period 1919-20-21	(5) % of (1) to	(6) % of (3) to
Nova Scotia	8,512j	2,416	988	278	352.	355.
Prince Edward Island	619	298	736	...	208.	...
New Brunswick	25,915k	8,261	51,292l	5,326	314.	963.
Quebec	1,231,357h	2,199,151	347,644i	499,973	56.	70.
Ontario — Central	5,150,612f	6,790,374	1,263,843g	1,557,672	76.	81.
Head of Lakes	1,512,976	1,602,484	66,860	105,849	94.	63.
Manitoba	24,641	26,036	39,240	27,291	95.	144.
Saskatchewan	342	744	1,024	583	46.	176.
Alberta	483	437	609	686	111.	89.
British Columbia	7,969	9,540	1,251	1,408	84.	89
Yukon	19	4	...	...	475.	...
TOTAL	7,963,44	10,639,745	1,773,487	2,199,066	75.	81.

TABLE 3, EXPORTS OF CANADIAN COAL

	(1) Total for Year to date 1922	(2) 3-Yr. Aver. for Period 1919-20-21	(3) % of (1) to (2)
Eastern Canada	685,313	995,940	69.
Western Canada	967,027	1,031,419	94.
TOTAL	1,652,340	2,027,359	82.

Note: Included in the above amounts are the following quantities of coal imported from Great Britain:

a	900 tons	e	16,404 tons	i	115,595 tons
b	102,879 tons	f	3,712 tons	j	3,267 tons
c	9,858 tons	g	3,217 tons	k	1,999 tons
d	3,965 tons	h	345,712 tons	l	14,052 tons

The Mining Districts

BY THE JOURNAL'S CORRESPONDENTS

NORTHERN ONTARIO

THE NINE MONTHS' RECORD.— The output of the metalliferous mines and smelters for the Province of Ontario for the nine months ending September 30th, amounted to $27,000,000 as compared with $21,000,000 for the corresponding period of the previous year. The principal increases were shown by gold, silver and cobalt oxide, while decreases were shown in the production of metallic nickel and pig iron. Production of gold during the third quarter was at the rate of $22,000,000 a year, and the Department of Mines states that the outlook for gold mining never before appeared to be better. The increase in silver is partly accounted for by the production from south Lorrain. The principal producers of silver were:—

Nipissing	2,960,000	ounces
Mining Corp.	1,289,000	"
O'Brien	884,000	"
Coniagas	827,000	"
Keeley	540,000	"

The gold producers were:—

Hollinger	$9,222,000
Dome	3,063,000
McIntyre	1,506,000
Wright-Hargraves	606,000
Teck Hughes	460,000
Lake Shore	393,000
Kirkland Gold	175,000
Kirk. Lake Prop.	70,000

The total tonnage treated by the gold mines was 1,671,000 tons and the average grade of all ore treated was $9.31 a ton. In Porcupine the Dome, with an average of $11.03, was the highest, while in Kirkland the Lake Shore had the highest heads of $20.54, with Kirkland Proprietary, $6.29, the lowest.

PORCUPINE.—The Night Hawk Peninsular property is offering to the public 300,000 shares of stock at $1.00 par. The capital of the company is $5,000,000 in $1.00 shares, of which 1,300,000 shares have already been issued. With the proceeds of the present issue the company will have $600,000 in cash and 400,000 shares of stock in the treasury, which will be used to continue underground development work and provide funds for the construction of a 200-ton milling plant. The property is considered to be a very promising one and ore reserves, to a depth of 300 feet, are estimated at 133,000 tons of $12.00 ore. — The Paymaster has succeeded in finding some more pockets of extremely rich ore. This ore is as rich as anything ever found in Ontario, and while the quantity is small the value will be considerable. The Dome regular quarterly dividend of 50 cents a share has been declared, payable January 20th. Directors officially announce that by next July arrangements should be completed whereby the shares will be of no par value, and four shares of new stock will be given for each of the present shares. They also state that by that time the present stock will be on a $4.00 dividend basis, which will be equivalent to $1.00 a year on the new stock. In order to insure a continuance of these dividends a fund of $1,000,000 has been created which will be added to from time to time until a full year's dividends is held in reserve. The financial statement of the company shows Cash on hand of $1,240,000 and Bonds amounting to $1,464,385. — The "Two in One" Mining Company, which owns 160 acres East of the Edwards property, have decided to diamond drill.

MORE POWER PROMISED.— The Northern Canada Power Company has decided to proceed with further power installations, calling for an expenditure of $1,000,000, which will provide an additional 4000 h.p. It is expected that the Sturgeon Falls power will be available before the end of January. The company is also considering the diversion of the Grassey River, which would given an additional 3000 h.p.

KIRKLAND.— The Lake Shore is dewatering the 600-foot level and is preparing to sink to 800 feet. A larger compressor has been installed and a new hoist of greater capacity has been ordered; larger crushers will also be installed at the shaft, and new buildings are being put up. This is all preparatory to increasing the milling capacity, work on which should be started before the middle of next year. The directors announced some time ago that mill extensions would not be started until the veins had been proven to a depth of 800 feet, which level should be reached by about the first of April. —A quarterly dividend of 2½ per cent., payable January 2nd, has been declared by the Wright-Hargreaves. —November production of the Teck-Hughes is understood to be very much less than September, which was a record month in the history of the company, with an output valued at $118,000. November production is understood to be about $40,000. Indications are that production for 1922 will amount to over $600,000, as compared with $322,000 in 1921. — Conditions at the Kirkland Gold are somewhat better than previously, and the company now has a considerable tonnage of ore ahead of the mill requirement. The average for the first nine months of the present year was $6.47 per ton, which does not leave much margin of profit, particularly as development costs are heavy, and shaft sinking during the present year has amounted to approximately 500 feet. It is believed, however, that results for the year will show small profit.

THE SILVER MINES.— During the month of November the Nipissing produced 327,000 ounces of silver of an estimated net value of $212,000, and shipped bullion of estimated net value of $165,000. The low grade mill treated 6,987 tons, of approximately 50- ounce ore, and the high-grade plant treated 241 tons. The refinery shipped 252,034 ounces. The production and value for 1922 should be in excess of the year 1921. For the first eleven months of the year the production was 2,912,000 ounces, as compared with 3,111,000 ounces for the full year of 1921, while the value of the 11 months' production is $1,989,000, as compared with $2,189,000 for the preceeding 12 months. It is understood that the cash surplus amounts to about $1,000,000. — The Castle Trethewey, in Gowganda, has decided to build a small mill, plans for which are being drawn by the McIntyre engineers. The Kerr Lake has declared the regular quarterly dividend of 12½ cents a share, payable January 15th, to holders of record January 2nd.

— Another discovery has been made on the Frontier property in South Lorrain, which is owned by the Mining Corporation. This discovery is on the Woods vein, not far from the Keeley line, and is several hundred feet from the main works of the Frontier. The vein is of very high-grade, and in one place is 24 inches wide.

NOVA SCOTIA

Collieries to Work Double Shift.— The Cape Breton collieries will be so active during the winter months that some of them will be placed on double shift. This shows a great improvement in the coal trade over last year, and instead of months of labor agitation and industrial unrest Cape Breton will enjoy business prosperity.

"Red" Tactics Condemned.— That some locals of the United Mine Workers in Nova Scotia are refusing to pay dues while the "red" executive holds office, and that another local is attaching the communist sentiments of the labor paper, is proof enough that the heart of Nova Scotia miners is true to the principals that their fathers have upheld for generations past.

Accidental Death, and Threat of Strike.— An inquiry was held by the chairman of the Workmen's Compensation Board into the death of a miner who was killed and found lying on one of the mine haulage roads. The evidence showed that the man had violated section 77 of the Mines Regulation Act, which states that "no persons or persons but those whose duties take them on haulage roads shall ride on trips or boxes." This man had no duties in such a place. The Compensation Board refused compensation to the relatives of the deceased.

The United Mine Workers held a meeting and decided that compensation must be paid or all the miners, including pumpmen and maintenance men, would be called out. Without making any attempt to have the matter settled, and without trying to show just cause for the payment of compensation, without, indeed, trying anything but a flourish of the "big stick" a threat of strike was made. Labor men of any standing usually exhaust every means to a settlement before a resort to the strike is considered, and it is surely a sign of want of intellect when there is no way but one found to settle disputes. At any rate, what has the Coal Company to do with deciding a case of compensation? Some day, before long, leaders who advise their followers to use such extreme measures as the threat of strike and starvation as a remedy for disputes that are not properly industrial will be returned to the ranks.

The Benefit of Co-operation.— For years strenuous efforts were made by leaders in high places to bring about an amicable understanding between the Nova Scotia Steel and the Dominion Coal Companies on the coal lease boundary question. The output of the two largest collieries at Sydney Mines had been much affected by the division of control, and the Scotia company stated that they required certain metallurgical coal that could only be had by permission to work part of the Dominion company's areas. This permission was given, but under conditions that were rather one-sided.

With the formation of the British Empire Steel Corporation the boundary line dispute has disappeared forever. The output of the Sydney Mines collieries has increased and the costs have fallen. Other charges made were calculated to put the coal industry of the district on a paying basis and to give steady employment to the mine workers. This policy is succeeding fairly well, and with the hearty co-operation of the workmen the cost of mining problems is being solved.

Centralization in Steel Plant.— The attention paid to the development of the coal mines has led rather to the neglect of the steel-making departments, and for more than two years the steel works at Sydney Mines has been quiet. Recent charges by which a number of the clerical staff and machine shop men were transfered to Sydney aroused suspicion, and an agitation was set afoot against the methods of the new corporation. This is little reason for such an outcry, for it is quite natural that the amalgamation of the two former companies should lead to centralization of both shops and executive offices.

Workmen have been loud in their criticism of alleged excessive overhead charges, due to excessive competition between the two former companies. Now they fail to appreciate the good effects that results from the removal of this rivalry. They cannot see that economies in the mining of coal were the first consideration, without which the steel industry would die a natural death. It may be that under the recent trade conditions the coal mines and steel mills could not both be kept running. If that was the case, and if the operation of the coal mines was profitable, than it is obvious that both should not be run, at a loss.

The British Empire Steel Corporation is getting down to an economical basis as rapidly as is possible. In doing this large savings have been effected, and steadier employment is resulting gradually. Sydney Mines will soon share in the general prosperity.

Montreal Market Regained.— A long step forward was made this year towards regaining the coal trade of the Montreal district, lost to the Americans during the war-time. 1,600,000 tons of Nova Scotia coal reached the Montreal market this year. That this could be done in spite of labor agitation extending over a period of ten months, and in the face of keen competition of American mines during the early part of the year, is very encouraging. The output for the year will be less than in 1921, but it is felt that the success gained in the St. Lawrence trade points to an increased output next year.

Coal of Good Quality.— There was never a time in the history of the Dominion Coal Company when

greater efforts were made to place coal of good quality on the market and to meet the demand of the public for a good product, than at present. The method of undercutting the coal has been changed in several of the collieries to ensure clean and large coal. The transportation, cleaning and assorting, screening and loading of the coal into cars are being improved daily, and the result shows that all these efforts have been to good effect.

BRITISH COLUMBIA

Alfred J. T. Taylor, who was head of the Taylor Engineering Company, Vancouver, which constructed the railway from Alice Arm to the Dolly Warden Mine and which afterwards took over the management of the mine, is moving to Toronto Ont., where he has been appointed vice-president and managing director of the Combustion Engineering Corporation, Ltd.

Discovery at Sandon.— The Reco Mine, Sandon Camp, is the scene of a new discovery, a fifth lead having been uncovered, three feet in width and carrying good values. Important development also is being carried on upon No. 2 Vein and the prospects are that the property will continue to be an important producer. The Reco Mine's four developed veins have yielded some $1,250,000 in the past, taking smelter returns as the basis for an estimate.

Discussion on Mine Taxation.— At a meeting of the Mining Association of the interior of British Columbia, held recently at Nelson, the interpretation of the clause of the Provincial Taxation Act, providing that allowances shall be made for depletion and depreciation, was discussed. The government has agreed that such allowance shall be made but the regulations for applying the same have not been issued. T. W. Bingay, J. P. McFadden, and C. B. White were appointed a committee to report on the regulations in question when they are issued. The Association went on record as opposed to the "Electrical Energy Inspection Bill" now before the provincial legislature. It was argued that this measure would be likely to come into conflict with Dominion regulations "for the control and distribution of electrical energy and modes of inspection thereof"; that it was not desirable that a "Dominion bureau of standards should be capable of being annulled by a Provincial Statute"; and that the effect would be to add to the "unnecessary and damaging overload of indirect taxation on the mining and other industries"; and that the proposal to limit the right of appeal to the Minister of Public Works was "dangerous and subversive of justice." Officers were elected as follows: President, R. Randolph Bruce, Invermere; J. P. McFadden, vice president; W. H. Burgess, secretary-treasurer; directors, S. S. Fowler, James Anderson, W. A. Cameron, T. W. Bingay, S. G. Blaylock, W. T. McDowell and three others yet to be named.

Trail Ore Receipts.— Ore receipts at the Trail smelter of the Consolidated Mining & Smelting Co. for the week from December 1 to 7 totalled 5,672 tons. Of this 5,039 tons were contributed by the company's mines. The other lots were made up as follows: Alamo, Alamo, 43 tons; Bell, Beaverdell, 43; Black Rock, Northport, 45; Knob Hill, Republic, 97; Paradise, Lake Windermere, 38; G. Peterson, Ainsworth, 23; Guilp, Republic, 103; Silversmith, Sandon, 79; Surprise, Republic, 162.

Consolidated to Resume Dividends.— J. J. Warren, president of the Consolidated Mining & Smelting Co., is quoted unofficially stating that the company will resume the payment of dividends at the end of the year. The last payment was in 1920, when the total disbursement was brought to $6,836,877, the distribution at that time amounting to $790,026. The annual report, it is stated, will say that the shareholders will have no reason to complain of the year's business. Ore receipts are shown to have been between 7,000 and 8,000 tons weekly and prices of metal in Canada and elsewhere on the whole have been favorable. The completion of the concentrator at Kimberley will lower costs, as the transportation of ore from the Sullivan Mine to the smelter will be materially lowered. The metallurgical plant of the smelter will be able to extend its custom business, while provision for an adequate volume of hydro-electric power and other improvement have put the company in a strong position.

Portland Canal.— The Mobile Mines Ltd., with a capitalization of $700,000, is opening up a property known as the Mobile Group, situated on the south fork of Glacier Creek at an elevation of about 1,000 feet above the old Portland Canal Mine workings. The ore carries high values in silver. Winter accommodation has been provided for a small crew and some shipments will be made by raw hiding to the Bear river wagon road, thence by sleigh to tidewater.

Exploration of Iron Ore Deposits.— Legislation is under consideration by the British Columbia Legislature having as its object the ratification of an agreement entered into between the Provincial and the Dominion Departments of Mines with reference to the exploration of the iron ore deposits of British Columbia. The Canadian Geological Survey, Ottawa, is to carry out the geological and topografical work and the Province it is proposed, will supply the funds to permit trenching, the sinking of pits, and drilling necessary to obtain information upon which to base an estimate of the tonnage of iron ore available for commercial use. The measure refers to give the Minister of Mines power to expend up to $50,000 on this work during 1923. Dr. G. A. Young, of the Survey, made a preliminary reconnaissance last summer. He will continue next year and will supervise any exploratory work that he may recommend as being needed to assist him in arriving at a quantitative estimate of the important iron ore deposits.

In introducing this Bill, Hon. Wm. Sloan, Minister of Mines, said:

"The agreement is the result of conference between the Geological Survey Department of the Dominion Government and the Mines Department of our own Province.

"The bill gives the Minister of Mines the right to enter upon any mining property without the consent of the owner for the purpose of carrying on such trenching, drilling and other work as is advisable. The Dominion Government undertakes to advise the Province what to do in this regard and the responsibility is on the Dominion to advise regarding the artificial exposure of ore, and the Dominion will make all necessary assays and other laboratory investigation of ore disposed. The Geological Survey will bear the cost of this work. The Province undertakes to do the actual exposing of the ore.

"Section 2 gives the minister the power to charge against the properties affected such portion of the cost of the work as he deems advisable.

"I have kept this section before the House to see what representations would be made as this is a large power to invest with the minister. The only representations that have come had been highly favorable as the iron ore resources of the province have hitherto been held for speculative purpose largely and very little work has been done. It is apparently agreed, therefore, that this power should be given the minister.

"The Dominion Government has appointed Dr. Young, its iron ore expert, in charge of the Dominion part of the work. He has done this kind of work with valuable results in New Brunswick, Ungava and northern Ontario, and comes well qualified and recommended for this work. He has already in the province and has spent four months this year examining iron deposits on the Coast. He is now in Ottawa preparing his report and will return to B. C., in January.

"The desirability of co-operation between the Province and the Dominion in the matter of a thorough exploration of the Iron Ore Deposits of British Columbia first was brought forcibly to my attention when some two years ago Major Crossland was appointed to investigate and report upon the tonnage of limonite ore in the Taseko district. The Canadian Geological Survey at the same time appointed Mr. Mackenzie to go into the same section for the purpose of making a topographical and geological survey. There was thus a certain amount of overlapping, and this agreement is designed to overcome any further such overlapping.

"In asking the Dominion to render assistance in this matter we have no hesitation, as under the terms of Union the Dominion Government agreed to undertake the expense of a geological survey in British Columbia. I have often in this House urged the necessity of that work being prosecuted vigorously in the interests of British Columbia mining.

"The Dominion Government did a great deal to build up the iron and steel industry in Nova Scotia. Under the Laurier government between $14,000,000 and $15,000,000 was spent to build up that industry by bounties. This province was not then in a position to avail itself of that policy, but I wish to draw attention to the fact that the people of this province contribued a large portion toward those bounties which were paid out in Nova Scotia.

"This Department has always taken the attitude that there were sufficient exposures of ore in B. C., to warrant the starting of a modest industry. The work done under this agreement will help to extend our knowledge of the iron deposits and will help to bring the facts before the public as to desirability of establishing an industry. There is every necessity that the work be proceeded with at once and for the purposes of the first year we are asking a vote of $50,000, which will be largely charged to the properties benefitted.

"Nothing will stimulate industary in British Columbia so much as the establishment of an iron and steel indnstry, which has been justly said to be the basis of all industrial enterprise. The Dominion has assisted in building up a great industry in eastern Canada. It started in a small way with a little forge employing 10 men. By means of the bounties these operations were extended, the Nova Scotia Steel Company and the Dominion Iron and Steel Company taking advantage of the bounties. These have now amalgamated as the British Empire Steel Corporation, one of the largest steel companies in the world. From that little beginning these companies have now blocked out on Bell Island a huge reserve of ore running 48 to 52 per cent. metallic iron in one of the largest ore deposits in the world, twice as large as the holdings of the United States Steel Corporation. This shows what can be done with proper government assistance.

"It is only a little over half a century ago that eight coal miners landed on Vancouver Island to open up the coal mine of Vancouver Island. Working first at Port Rupert they sent a small shipment to San Francisco, but this proved disappointing and they moved to Nanaimo. From that small beginning has come the great coal industry of British Columbia, which is not only valuable for the tonnage produced, but for the knowledge that it has given us of the coal resources in British Columbia, not only on Vancouver Island, but in the Nicola and in the Rockies".

The Minister traced also the great development in metalliferous mining, referring to Kimberly, Stewart and Atlin, where some of the greatest properties in the world were being developed from small beginnings.

"British Columbia is an Empire in extent", he continued. "The instances I have cited show the marvellous development of the past few years. An iron and steel industry will not only promote other industry, but trade and commerce and navigation which are matters of Dominion interest, and the Dominion cannot object if we ask them for material assistance in developing this industry in British Columbia.

"It requires no vision to agree with the prophecy made a few years ago by a distinguished statesman that the chief theatre of development and activity for the coming century will be on the shores and island of the Pacific, and in that development British Columbia with its hundreds of miles of coast line studded with fine harbors will have a great part.

"I believe that this agreement which I am asking the Legislature to ratify will have much to do with the development of the province in the next few years".

Strike Abandoned.— A strike has been called in District No. 18, United Mine Workers of America. Thus far it seems to have affected only certain coal fields in the Province of Alberta. The Crow's Nest Pass and other parts of eastern British Columbia have not yet been drawn into the trouble. Headquarters of the U. M. W. of A., Calgary, Alberta explained at the outset that the Union was demanding recognition and an agreement to negotiate a wage scale in the local field. Subsequently intimation was received that the strike was not authorized by the U. M. W. of A., that the men had not really gone on strike but merely had ceased work in order to hold a meeting to discuss certain grievances, and that the entire situation was to be investigated by the Union. Meanwhile on December 4th, intimation was received of the arrest of William Ryan, Vice-President of the U. M. W. of A. at the Black Diamond Mine near Edmonton, on a charge of having refused to the Company's premises when ordered to do so. Conditions and the issues seem rather confused. There is no doubt, however, that most of the mines are working without interruption and production is not likely to be seriously affected by these disturbances.

Settlers Claim Coal Rights.— The question of the claims of certain pioneer settlers within the Esquimalt and Nanaimo Railway Land Belt, Vancouver Island, to the under surface rights of land upon which they settled, was before the Provincial Legislature a few days ago. Hon. Wm. Sloan, Minister of Mines, reviewed the history of the efforts that have been made to secure the coal underlying these lands for the settlers able to prove their right to the same. He explained that the Van-

couver Island Settlers' Rights Act had been enacted by the British Columbia Legislature several times, but had not been allowed to become law by the Lieutenant Governor. For this reason before the measure was again enacted, British Columbia had asked the Dominion whether there was any likelihood of a change in its attitude. Replies received from the present federal premier indicated that no charge is likely and for that reason it was considered useless to again introduce and pass the measure.

Coal Mine Accident.—Alfred Odgers, a fireboss, and Gilbert McBroom, a pumpman in the employ of the Western Fuel Corporation of Canada, were killed by an explosion which took place on November 24th last, in the Wakesiah Mine, near Nanaimo. The jury brought in a verdict of death from an explosion of gas, attaching no blame to anyone.

In the course of the Coroner's inquiry, evidence of rather more than usual interest was adduced. W. H. Moore, manager of the mine said:

"There is no doubt in my mind that gas was ignited by the safety lamp which Odgers was using. The lamp was sitting within twenty one feet of the nozzle of the hose through which Odgers had blown compressed air in order to clear the place of gas which he had found there. He blew the gas through the gauze of the lamp. There is no doubt that every make of safety lamp will pass flame at a certain temperature.

"So far as velocity is concerned, it is not unusual on the compressed air line, to have a pressure of from 2000 to 3000 feet per minute. In this case I think an explosive mixture was driven through the lamp and that the initial point of ignition came from the lamp. A hot lamp is not safe at a velocity of 3600 feet per minute. I believe there have been scores of cases where explosions have been attributed to some fantastic reason, when the real reason was a safety lamp. But never before has an explosion been so clearly demonstrated as having come from a safety lamp."

Sam Mottishaw, who had had a seventeen years' experience as a fireboss, was firmly of the opinion that the explosion was caused by the gas being driven through the safety lamp. After the explosion, Mr. Mottishaw stated he was in the lamp cabin when the lamp was brought in and tested. He saw four explosions take place in the lamp. He then explained how it would be possible for a safety to ignite gas. In the gauze there were 784 perforations to the square inch, when the gauze is cold or normal condition, the flame will not pass through these openings, but if the gauze becomes heated the flames will jet through. He believed the velocity, even without the lamp's being heated, would cause the explosion—or soot on the gauze would cause the gas to ignite.

Estimated Coal Production for 1922.—The coal output of British Columbia for 1922 will be approximately 2,620,669 tons, according to monthly figures from the collieries. This allows 250,000 tons for the month of December. As the production for the month of September was 267,355 tons, for October 251,631 and for November 350,032, it seems safe to place that for the last month of the year at around a quarter of a million tons. Note, however, should be taken of the fact that the Canadian Collieries (D) Ltd. have found it necessary to close down one of their Cumberland mines. Still, although the effect of this may be felt, the loss should be absorbed without material reduction in the grand total. Official returns for the year 1921 placed production at 2,483,995 tons, so that December has to account for some 113,326 tons to equal the figure of the previous year. This will be done without trouble. The chances are that it will be substantially exceeded, but it also is probable that when final official statistics are out for 1922 it will be found that there is not much difference between the two years.

Quick Recovery of Crow's Nest Production.—One of the features of the year in British Columbia coal Mining has been the recovery of the Crow's Nest Pass field after the strike trouble of the opening months of 1922. For a considerable time the mines of Coal Creek and of other parts of the district were idle. When the differences were adjusted the mines almost immediately jumped in point of production to their usual monthly average tonnage. They have remained steadily at that figure throughout the remainder of the year. This is an achievement, when it is remembered that it is no easy task to quickly place a coal mine that has been inactive for a long period in a healthy condition as to output and also that, of late, the collieries of the eastern part of the province have been handicapped by the effects of the Fordney Tariff. The imposition of 53 cents a ton on soft coal entering the United States applies to all Canadian coal, it is true, but in the Crow's Nest it hurts, perhaps, more that it does on the Coast for the reason that the Great Northern Ry. Co. takes a considerable quantity of the coal produced there. Coke, of course, still is manufactured for the Trail smelter, but the market for that fuel has been curtailed in recent years by the closing down of the boundary smelters. W. R. Wilson, president of the Crow's Nest Pass Coal Co., now is turning his attention to the prairie trade and having a better quality coal that most of that of the Province of Alberta, it should be possible, given anything like a chance in the matter of freight charges, to popularize the fuel of the Crow's Nest for domestic use in the provinces of Saskatchewan and Manitoba.

Coalmont Coal Company.—In the Nicola Princeton Field there has been one development of outstanding importance, namely, the development of the Coalmont Coal Company. The coal of this mine is of good grade. Production has been brought up to around 700 or 800 tons a day. Of this the Great Northern Ry. Co. is reported to be absorbing some 500 tons a day. The Company has materially extended and improved its equipment and its underground workings are rapidly growing. The Princeton and Middlesboro Collieries are maintaining a steady output. The Kettle Valley Ry. uses a considerable quantity of the [illegible] latter Company. As yet the output [illegible] been able to loosen in market [illegible] Vancouver Island coal has on the [illegible] market of the Coast.

Vancouver Island Production.—On Vancouver Island the production has fluctuated during the year as the demand stiffened or slackened. There have been months when the large operators [illegible] worked only part time. At [illegible] United States strike had been [illegible] its effects felt [illegible] Western Fuel Corporation [illegible] full capacity and [illegible] new record. Then the Canadian Collieries [illegible] the mines of other company [illegible] could be taken care of and [illegible] withstanding that the domestic [illegible] activity but not to [illegible] coal export trade is not [illegible] conclusively prove that [illegible]

Collieries in ceasing work in one of their Cumberland Mines. Considered comparatively, however, the year cannot be termed unsatisfactory from the viewpoint of island collieries. There have been no labour troubles, the feeling between employee and employer was never better. The Canadian Collieries and the Western Fue. Co. both have been prospecting and exploring new ground. A new mine is to be opened up by an independent operator near Nanaimo and shortly is expected to be on a producing basis.

OIL PRODUCTION IN SOVIET RUSSIA

The following report, originating in a Morocow paper and quoted in U. S. Commerce Reports, will give some idea of present conditions in the Baku oilfields near the Black Sea. The pood is 36 pounds.

The financial situation in the Azneft is as follows: Between January 1 and September 1 we have shipped into the interior 120,000,000 poods of petroleum products, to the value of 61,000,000 gold rubles, and against it we have received from the central govt. only 3,500,000 to 4,000,000 rubles, so that we had to shift for ourselves to cover our operating expenses, mainly by selling our products abroad and into Transcaucasia. But this can not go on.

At present we are managing our foreign business through the Arcos, but its organization is not strong enough and is unable to take care of our large stocks of kerosene and oils stored at Batum, while no other organizations are permit ted to sell kerosene abroad.

Under the program of production for 1922-23 of 240,-000,000 poods, we would have to start drilling 192 new wells, aggregating in depth 80,000 to 90,000 yards for the year, which would cost 25,000,000 gold rubles, 40 per cent of which sum must be furnished at once in soviet currency and the rest in installments. Under the smaller program, for a production of 205,000,000 poods, the cost of drilling new wells will amount to 17,000,000 to 18,000,000 gold rubles.

It must also be borne in mind that by November 1 our supplies of petroleum products at Baku will be completely exhausted and that at the opening of the next navigation season the supplies will not exceed 50,000,000 poods of products, and of a questionable quality at that, out of residues. Consequently, without forcing new drilling, an oil famine in 1923 is unavoidable, and therefore money for drilling is needed at once. As to operating funds, the sum required is 96,000,000 gold rubles for the larger program and 82,000,000 for the smaller one.

The New Modder, described as "the Rand's richest gold mine," has reduced its working costs from 22s to 10d per ton, as of 1921, to 16s. 9.6d during the financial year just closed.

Advertisements other than "Employment Wanted" or "Employees Wanted" will be inserted in this department at the rate of 20 cents per agate line (14 agate lines make one inch) $2.80 per inch, each insertion, payable in advance. Space measured from rule to rule. When four or more consecutive insertions of the same advertisement are ordered a discount of 25 per cent. will be allowed.

Advertisements of "Wanted Employment" or "Wanted Employees" will be inserted at the rate of two cents a word, net. Cash must accompany order. If box number is used, enclose ten cents extra for postage in forwarding replies. Minimum charge 50 cents.

FOR SALE: — Felspar property situated in Eastern Ontario adjacent to the I. B. N. O. Railway about one mile from public siding. Government assay shows good commercial spar. Willing to form small company to operate this property. Apply J. Grigor, 420 Manning Ave., Toronto.

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Agitators:
The Dorr Co.
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Canadian Steel Foundries, Ltd
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Canadian Link-Belt Co., Ltd.
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The Consol'd Mining & Smelting Co

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The William Kennedy & Sons, Ltd.
Peacock Bros., Ltd.

Bucket Lips:
Canadian Steel Foundries, Ltd

Cable — Aerial and Underground:
Canada Wire & Cable Co
Standard Underground Cable Co. of Canada Ltd
Peacock Brothers, Limited

A HAPPY NEW YEAR

Gold mining withstands the difficulties of every climate and unfavorable geographical situation. While the production of iron and the winning of coal can only be carried on successfully on a large scale, they are [also] dependent on trade conditions. —*W. G. Miller* — 1902.

SOME CANADIAN MINES

This is the stock-taking time of year. During the next few weeks the mining industry of Canada will be examined from every angle, weighed, judged, criticised, commended. Some of this discussion will be interesting, and much of it will be useful. We wish to prepare for it today by setting down a small item of information that may serve as a basis for comparison during the ensuing weeks when a sense of proportion is more than likely to give way to special pleading or sectional enthusiasm.

The great mining camps of the world are, quite properly, known by their names; their records of production are seldom appended. Yet this record is the truly significant feature. It will be pertinent to glance at the records of some Canadian camps and their prospects for the future.

The asbestos industry of Quebec has produced $100,000,000. Its reserves contain an equal or greater value, and no end of the deposits is yet in sight. The world can look to Quebec for its supply of high-grade asbestos for many, many years to come.

Similarly, the Sudbury nickel field, with a production of close on $200,000,000, has reserves that can at least duplicate the record to date and much of the productive area still unexplored can be depended upon to preserve for decades its present virtual monopoly, which is dependent solely upon the richness of the ore.

The Cobalt silver mines have produced more than $200,000,000 in silver. The camp is past its zenith, but will add scores of millions yet to its record. The adjoining South Lorrain mines are waxing as the older mines wane.

The Porcupine gold camp, still in the first flush of youth, gives promise of being the largest producer of mineral wealth in Canada. With $100,000,000 to its credit already, ore reserves that promise as much in addition, and several times the total visible to be expected rationally, it will be hard to beat.

The Rossland gold-copper camp, with all its richer ore extracted, is still going strong on ore of lower grade. Its record of $80,000,000 from such a small area is remarkable.

The Phoenix has failed to renew its youth; the mines are exhausted. But before the pumps were pulled, the satisfactory total of $65,000,000 had been taken from these famous old mines.

On the Coast, the mines are still youthful, with records still in the making. The Britannia mine, which with new equipment will soon be the largest producer of copper in the Empire, has already a record of $25,000,000, just as a good "starter."

These are a few of the camps with established records. Many, such as Sullivan, Mayo, Hidden Creek and Kirkland, are merely commencing careers of usefulness.

While the records of these Canadian camps cannot compare with such a unique producer as the Rand, they do compare very favourably with the majority of the world's famous mining camps.

THE PROFESSIONAL PROSPECTOR'S

On numerous occasions we have referred in these columns to the fact that the typical Canadian prospector of today is a very different person from his predecessor of even two decades ago. While this fact and its significance have been grasped clearly by those whose lot it is to move among prospectors and to deal with them, there remains a large part, perhaps a majority, of those in the mining industry who do not, or will not, notice the change.

This failure on the part of many to realize the present status of the prospector and his work in Canada has a noticeably detrimental effect on the mining industry. There was distinct evidence of this at the annual meeting of the Canadian Institute of Mining and Metallurgy in Ottawa last March. When prospectors were mentioned by a number of the speakers it was obvious that they looked upon these pioneers as distinct and separate from those of the mining profession, and relegated them to a very lowly position indeed among those attendant on the mining industry.

The popular misconceptions about the prospector do not help the case at all. He is commonly regarded as a misguided enthusiast who is hunting for a needle in a haystack. Sometimes he has the luck to happen on the needle, and that keeps the supply of new mines up to requirement.

The facts about the present day prospector are, of course, quite otherwise. He is a far [illegible] than

usual intelligence and perspicuity, and is possessed not only of the inward urge that impels all pioneers, but must have in more than ordinary degree the perspicacity that is characteristic of the Anglo-Saxon race. To keep at his chosen work faithfully, day after day, month after month and season after season, often in the face of successive and bitter disappointments, is a test of character that few of his fellow-beings are called upon to face. The modern prospector's life may not have all the glamour that is sometimes ascribed to it; but it has enough action and excitement to hold the interest of a well-selected lot of vigorous Canadians, the true story of whose accomplishment and sheer courage would cause many of the rest of us to feel ashamed of our efforts, puny in comparison.

Today we print an account of prospecting, written by a prospector. Mr. Tom Saville is known to a wide circle in the mining community of Ontario. His story almost tempts us to desert the editorial chair for a season. But Mr. Saville uses his story for a purpose. He does here what many a prospector has done round the camp-fire; he provides an idea for his friend the geologist to work on. Many a fine-spun geological theory is woven from material provided by the acute observations of the prospector. Usually (but not always) the geologist has acknowledged the source of his inspiration.

Most valuable in Mr. Saville's article, though, is the direct and indubitable evidence of the progress of the prospector along the road of learning. His acquirements in the way of technical information are now of considerable proportions, and he is advancing with almost unbelievable rapidity. Two decades of time have witnessed progress that few would have predicted. The effect on our mineral industry is bound to be of first-rate importance; indeed, we are already reaping the benefit of the trained prospector's well-directed efforts. The time may come when even the Canadian Institute of Mining and Metallurgy will recognize the prospector as the equal of those among its members that are willing, and indeed anxious, to follow the trail that he blazes.

WHERE DO THE METALS GO?

One sometimes wonders what happens to the world's ever-increasing output of metals and non-metallic minerals,—an output that we are told will continue to grow indefinitely. It is hardly likely that the present rate of increase in the annual consumption of mineral products will last indefinitely; but we are not yet in sight of the time when even the per capita consumption will remain stationary. As was aptly said recently by a prominent Canadian metallurgist, mining is the basic industry of progress, as agriculture is of subsistence. Consequently, as long as our material civilization continues to progress and with it our demands for further creature comfort, so long will mineral production proceed apace.

Sometimes we think of the world's metal as a cumulative quantity to which is added an annual quota of huge dimensions. This is partly the case, and particularly so in Canada, where our population is expanding so rapidly and with it the requirements in metal that are necessities in this age and in this country. Every settler must have his stove, agricultural implements and tools of iron and steel, to say nothing of nails, hinges and a hundred such incidental requirements. Wire fencing will amount eventually to many hundred-weights, or even tons, on his farm. To market his products he must have a wagon or an automobile and sleighs, as well as a railway within a reasonable distance, all these transportation facilities being large consumers of iron and steel as well as of the other metals. As settlement progresses, the proportion of metals used increases rapidly. Telephone and electric transmission lines, a wide range of labour-saving machinery and modernly equipped farm buildings swell considerably the amount of metals per capita. Similarly with non-metallic products, the farmer is a large consumer. The growing use of cement and drain tiles will serve to illustrate the tendency.

In the towns and cities, there is an even greater dependence upon mineral products, though as much by way of convenience and luxury as of necessity. The weight of the iron and steel pipe necessary to serve a single house with water and to distribute the heat from its furnace will surprise most householders. There are yards of drain pipe for each dwelling. The barrels of cement required for the foundations, sidewalks and pavement required for each house have done their bit in helping to absorb the millions of dollars of "water" from the stock of our famous (or notorious) cement merger. The bricks that are in growing favour for houses are a mineral product, as is the lime in the mortar. As for dishes—the mineral industry should, in mere justice, raise a memorial to the dish-smasher,—not that we can ever forget her or be without her.

This list could be extended to include steamships, all our electric facilities, and a host of the mechanical features of our civilization. But we shall desist, merely adding a mention of the means whereby the metals are returned again to mother earth, mainly as the oxides from which they were derived originally. This mention of oxides gives the key to most of the wastage. Only a small proportion of the rolled sheet products of iron and steel are ever recovered as scrap, and this probably aids to a measurable extent in maintaining the tremendous dimensions of the world's annual output of iron and steel. The salvage of copper, less subject to oxidation, reaches significant proportions. Aluminium also can be reclaimed in large degree. As for non-metallic minerals, it is seldom that they can serve any but their original use.

All things considered, there is no danger of this or the next generation of mining engineers being out of a job on account of a slacking off in the demand for mineral products.

HUMAN EFFICIENCY

A very interesting and instructive presidential address was delievered last month by Professor E. P. Catheart to the Physiology Section of the British Association.

The address to which we are referring was entitled "The Efficiency of Man and the Factors which Influence It"; and the speaker gave it as his opinion that there were at least four factors which played predominant parts in the attainment of maximum efficiency. These four factors he pronounced to be the following: First, the rate of the performance of work; secondly, the amount of rest offered to, or taken by, the subject; thirdly, the rhythm with which the work is performed; and, fourthly, the work habits developed by the worker. These factors are all intimately related, and, in fact, usually merge into one another.

Of the four factors mentioned, it is certain that most attention is usually devoted to the rate of speed at which the work is carried out. Indeed, it is probable that, in this connection, the old adage, "Time is money," has, like a good many other half-truths, been overworked and has been responsible for much false philosophy. In Professor Catheart's opinion, at any rate, the correct stress on the relation of speed to general industrial efficiency is that which is thus laid: "No movement can be compared with another and said to be better than it merely on account of its speed; it should only be compared in respect to ease and final result." If this is right—and we are disposed to think it is—then those who believe that maximum efficieney can be best obtained by mere speeding-up are thinking along wrong lines.

One of the chief sources of general inefficiency among workers is a wrong diet. The inadequately or wrongly fed worker is incapable of the best work. Then the worker is affected by the monotony or fatigue of his work. There is, possibly, a close relationship between monotony and fatigue, but the two are not identical. As regards the former, the temperament of the individual worker plays an enormous part in determining whether a particular operation in a plant is a monotonous one. So far as fatigue is concerned, this is often closely related to several other factors, such as the lighting, heat and ventilation of the plant. For example, in very many plants it will be found that the late afternoon is the most unproductive period of the entire day, and fatigue is the chief reason for this unprodnctivity, with lack of pure, fresh air as the primary cause of the fatigue. With this question of fatigue, too, the mode of life led by the worker outside his definite hours of labor, his housing and so forth have a good deal to do.

In short, individual industrial efficiency cannot be casually referred to any single factor, for it is dependent upon a multiplicity of factors, most of them, doubtless, more or less correlated. It cannot be said of real industrial efficiency that it means just the mere capacity of the individual to perform so many kilogrammetres of work in a given time with the smallest expenditure of energy. For all who have given thought to the matter realize that it means a good deal more than that. Indeed, as Professor Cathcart puts it, "the quest of efficieney is one of the most intricate problems, in its infinite ramifications of the physiological and sociological structure, which have ever called for solution, and it involves the whole welfare of our race and nation."

As such, it calls for the closest and most intimate cooperation between the scientific investigator, the employer and the employee. In such cooperation, it is obvious that work along the lines of welfare endeavor has an important role to play. The spirit of welfare work is that of goodwill, such as is only possible where employers and employees can get together in good comradeship. Negative goodwill, is of little worth in such a connection. The vital thing is active cooperation. In Canada, we have the plants, the skilled workers and the able direction. But still too largely the spirit of active cooperation is lacking. It can only be satisfactorily secured when mutual distrust of motives, capacities and methods is stilled. We need a larger statesmanship and a truer vision among all those concerned, in whatever capacity, with industrial relationships, not only in their wider national aspects, but in individual firms. And work along the lines of welfare endeavor affords an example as to the method by which not only class antagonisms, but even national antagonisms, may some day be allayed.

We note with interest the fact that in the current annual report of the mining engineer to the Temiskaming and Northern Ontario Railway the *Journal's* lead of a quotation from a Canadian mining man has been followed. The striking words of Dr. Barlow there quoted we used on April 14th last to inaugurate our series. His faith in the Northland is fast being fulfilled.

HYPAETHRAL LEGISLATION

("I smell a rat — I see it floating in the air." — Irish Parliamentary Speech.)

Toronto Broker (loq.):—

A cloud, no larger than my hand, affronts
Th'untainted blue. No more promoters' stunts
Can be pulled off with that impunity
That marked the times of our immunity
From azure legislation. Henceforth we
Must act with care and with propriety
The little tricks we treasure in our trade,
The little turn by which our oof is made,
If one is caught at them 'twill be in vain the
Appeals for clemency from Mister Raney.

* * *

In other words, we guys are up the flue,
Upon my soul, I don't know what we'll do!
Twixt Mister Raney and that blasted Journal
We crack the nut and others get the kernel.
I see it coming rapidly, alas!
Standard Exchange — a Sunday Bible Class!

J. C. M.

The Future of Feldspar

by J. C. MURRAY

Very serious and concerted efforts are now being directed to the examination of conditions under which feldspar is quarried, shipped, and milled. The American Ceramic Society, a live and exceedingly active organization, through its official publication has collected and published much information bearing upon the possibility of adopting standard specifications whereby to regulate the quality of feldspar shipped. The question of formulating specifications is one beset with many difficulties and complications. To assist in defining these difficulties and in discovering correctives, the Society is to hold a special meeting in Pittsburgh in February next at which a large representation of both producers and consumers of feldspar is expected. It would be well-advised for all Canadians interested in feldspar to identify themselves with this movement by joining the Ceramic Society and attending the Pittsburgh meeting.

A few notes on the present status of the "specifications" problem will, perhaps, stimulate interest amongst those of the *Canadian Mining Journal's* readers who are concerned with feldspar.

In a discussion published in the Journal of the American Ceramic Society, November, 1922, Mr. Raymond B. Ladoo, of the United States Bureau of Mines, sums up matters thus:

"It is very necessary that both the feldspar producer and the consumer agree upon standards of feldspar for various uses, not only upon grades but upon types of feldspar and fineness of grinding. This subject must be approached, however, with great care, for opinions as to the needs of individual consumers differ. . . . . Specifications to be workable and satisfactory to both producers and consumers, must be formed by the joint action of men of wide experience, representing both producers and consumers . . . . . Absolute standardization of feldspar in the sense that is implied in the standardization of screw threads, of rail sizes and weights, etc, is impossible. Instead, an attempt should be made at first to draw up specifications for different uses giving rather wide tolerances. Such specifications might mention the most acceptable fineness for grinding, the total alkali content, the maximum allowable iron content, or whether or not impurities such as tourmaline, hornblende, garnet, pyrite, biotite, etc., shall be tolerated. It would be expected that these specifications would be revised at stated periods."

Another contributor to the discussion, Mr. W. H Landers, refers thus to the trouble caused by the presence of iron in feldspar: "So far, no one has been able to prevent dark specks completely in the fused samples when these are examined under a magnifying glass. There is no excuse, however, for these specks to be of such size as to be plainly visible to the naked eye. It represents bad milling practice or the improper choice of raw material." Mr. Landers proceeds to point out that, while millers may be very careful in their choice of raw material, far too much is taken for granted in the process of milling. "Plain engineering by some one not *too* familiar with the feldspar industry would greatly improve the quality of the product they turn out, especially as regards these iron specks."

Mr. Landers alludes pointedly to the danger of contamination with iron from sources other than the quarry. Mine cars, wagons, railway cars, cinders from locomotives, are all possible sources of contamination. "Tramp" iron may reach the feldspar from these and other points of contact. To a great extent these can be guarded against. One neglected precaution, however, is suggested by Mr. Landers. He scoffs at the possibility or serious contamination from jaw crushers, as the loss of iron from these crushers is "ridiculously low." But he suggests that it might be a good idea to get an analysis of some of the chaser stones now in use.

The outstanding feature of nearly all the recent discussions is the unqualified admission that the feldspar industry requires revision in a thorough-going manner.

The most radical changes in milling will, in all probability be recommended and gradually adopted. This will involve the scrapping of many old-fashioned plants that should have been condemned as obsolete long ago. The producer of feldspar will be forced to turn out a clean, graded product. Certain stated precautions and safeguards against contamination of the crude feldspar at the quarry, in transit, and in the mill will be adopted Competition will make it imperative that these precautions be observed. The producer or the miller who does not observe them will lose his business to the producer or miller who does observe them.

The movement for betterment of the industry is no flash in the pan. It is a serious movement sponsored by the United States Government and directed by capable business men. Canadians will lose a real opportunity if they do not follow the lead. It is to be regretted that the initiative was not not taken by our own Mines Branch The question was submitted to the Branch at Ottawa some time ago. The reception vouchsafed the request that the feldspar situation be looked into by officials of the Mines Branch affords a painful contrast to the zealous helpfulness of the United States Bureau of Mines.

A USEFUL DODGE

Some weeks ago, Mr. H. E. Holland, Mining Recorder of the Lake of the Woods District, having occasion to enlarge a map, bethought himself of the little toy radiopticon that his children amused themselves with. Inserting a plan of the region he wished to enlarge, he had no difficulty in so arranging it that it bore the necessary scale on the drawing paper. The outline was traced in pencil, afterwards inked in, and from this a copy on tracing cloth was finally made, permitting blue prints to be run off.

A draughtsman in the employ of the Backus Lumber company, on hearing of the recorder's success, hastened to invoke the aid of the radiopticon, and it is perhaps safe to say that no child's plaything was ever made to serve a more useful purpose.

To such engineers as happen to be places where there are no well-appointed draughting offices, the aid of some such modest instrument might be welcome.—C. A. B.

During 1921, Spain exported copper and its ores to the value of 7 million dollars; iron ore, three millions; iron pyrites, two millions; and pig lead 5 1-2 million dollars Quicksilver to the value of half a million dollars, and sphalerite, $100,000 were the only other mineral exports of note.

The Golden Mystery

THE MODERN PROSPECTOR CONTRIBUTES TO CURRENT ECONOMIC GEOLOGY.

BY TOM SAVILLE

A bunch of us savages had just got into the realm of the Iron Horse, fresh from the Grassy River country, and were eating up our mail at the Hudson's Bay Company's post at Fort Metagama. We were all feeling pretty good after bucking the ice for the last few days— it had caught us while camped on Ka-ste-pa-ka-ma, where we had run into some of Percy Hopkins' pet formation, the "Timiskaming Series," and had promptly forgotten that we were on our way out, running a race with the freeze-up, and that our grubstake was just about "all in." However, here we were, all of us, and everybody happy to be alive—and why shouldn't we be? This Hudson's Bay man was real glad to see us, and the door was thrown open wide.

Well, as I said before, we were all enjoying ourselves. Some good, green birch wood was burning in the open fire place. We were all dried out by this time and could hear moose meat frying for our supper. Pete was reading in the *Globe* about "the Terrible Turks." Bob, the American was lost in the *Literary Digest's* Prohibition Poll, and the Old Timer was scouting the last issue of the *Canadian Mining Journal* in the hope of locating some article that would throw light on "the golden mystery." Nobody was saying very much, but I could see that the Old Timer was priming himself to shoot something; for it don't take many moons camping and sleeping under the same Hudson Bays to get acquainted with your partner's little ways. The Old Timer never had very much to say, but when he did open his mouth to talk, he usually said something that made good listening.

"Say, boys, here's something that's real man's stuff and written in our language so as we can understand it." Reads Cyril Knight's latest report on Lightning River Gold Area. This, of course, starts something and all you can hear for a while is volcanics, shear zones, contacts, porphyry intrusions, and the Temiskaming Series. Then the Hudson's Bay man breaks in on us with a voice like Foghorn MacDonald's—"Here, you rock hounds! The moose meat's getting cold." "All right, boys," says the Old Timer. "Let's go feed and after supper when we get a smoke up I'll tell you something I've had on my mind for quite a while. It's a little story about the Iron Formation." So we pass in to the room to eat and are made acquainted with Mr. Hudson's Bay and family.

After McLeod, the factor, says "Magutch" we let him entertain us, while we entertain his moose meat. Then presently we hear him say, "Well, boys, times do change. I remember when you prospectors was a damn nuisance to the Hudson's Bay Company, and here we are all now with our moccasins under the same table."

"Yes," speaks up the Old Timer, "I mind making a trip down the Missinabi a few years ago hunting for them lost placers, and the Company would stake us to all the grub we needed to hunt and trap, but just enough to get to hell out of the country when they learnt we was prospectors. They claimed it would ruin the fur trade if the country got opened up."

"Well," says McLeod, "we have learnt that it is poor business to try and halt the march of progress, and the policy of the Company now is to help and share in the development of the country, and I sure do hope you boys dig up a mining camp back there where you were scouting this summer. How does she look, anyway?"

"Well," speaks up Bob, who up to this time had been a good listener, "she looks good enough to me to get an outfit and hunt and trap in there this winter so as to be ready for next spring. And I guess I won't have to travel very far to locate the rest of the bunch. I believe they are just as much in love with the possibilities of that country as I am."

"Did you see any gold?" says McLeod.

"Yes, we seen a little—nothing spectacular. But we don't worry much about that spectacular stuff now," says Bob.

"Well, what do you look for?" says McLeod. "Tell me something about this prospecting game. About all I know now is that if you fellows don't strike it this season, you come get an outfit about freeze up and hunt and trap until spring. That keeps the pot a boiling for the next summer's prospecting, I suppose. I'm living in this country with you fellows and I've interested in your work. Now, you'll be staying here for a few days until the ice takes, getting your outfits together, and if you care to tell me, I'd like to listen to an account of this prospecting game."

Bob sees that he is stuck for the talking, so he begins. "Us fellows that are in this game for keeps have learnt to take advantage of the other fellow's experience. This is the way it goes: the Department of Mines employs a bunch of Geologists that are crackerjacks at unravelling in a few of the summer months what it took Dame Nature some millions of years to wind up and hide. Their reports are written so that us fellows can follow them, and with them are maps showing the different rock formations. These are sent to us free for the asking and all that is necessary now when you are prospecting for gold is to read up these reports and look up the geology on the ground, and if there shows any Temiskaming Series with intrusions of porphyries kicking in, then we just sound round the contacts of the quartz porphyry, and on the porphyry itself if it should happen to be feldspar porphyry."

"That all sounds easy enough," says McLeod, "but how can you tell one rock from another?"

Well, I'll tell you, says Bob. "The Ontario Provincial Geologist, Dr. Miller, has written a book called Minerals and How They Occur. Where they occur and is there. Of course it is how you look for it, but all the essentials are in that book, and a fellow can build himself up pretty [illegible] to. And let me tell you that the prospector of today is taking advantage of most everything written that has to do with Economic Geology. Why, I'll bet the smallest kid of every one of this bunch of sourdoughs is packing around in his war bag some book on Geology."

"Well, well!" says McLeod. "I always thought you fellows despised that sort of high brow stuff."

"So we did till we learned we were cheating ourselves out of a lot of valuable information."

"Well, that's pretty good for a start," says McLeod, "and now that everybody's quit wrestling with the moose meat, what do you say we go throw on a couple of sticks of birch, and sit around and listen to old Bill and his story about his Iron Formation."

The Old Timer poked a dry sliver in the fire to light his pipe with, and then began. "The first time I run up agin' this Iron Formation was down in the Timagami, before the T. and N. O. was built, and you all know what that means—no Cobalt, or Kirkland Lake or Porcupine or any other mining camp in that neck of the woods. Dan O'Connor, the King of Timagami, was doing some work on a banded jaspilite-magnetite layout, and so was that grand old prospector Lanark, T. B. Caldwell. Major Leckie (bless him), the father of Jack, was scouting around a little to the north. C. C. Farr, the Father of Haileybury, was doing some scratching around Temiskaming, and that, with the Fergusons and the Wrights (Red and Marty) about completes the bunch of prospectors in the North at that time.

"Well, coming back to the Iron Formation, or Temiskaming Series (call it whatever you want to—it's all the same to old Bill), she's very much in evidence aromnd Timagami, and I don't think that the story is all told yet about that district—not by a long shot! The next place I run into my friend the Iron Formation was in Cobalt. It's true there's not an awful lot exposed, but it's there, just the same. The next noise, as you will all remember, was up the Montreal River. I don't mind seeing any in Elk Lake—not till you get to Matachewan,—and you all know what transportation is going to do for that coming camp.

"When we work west from Elk Lake to Silver Lake, Bloom Lake, Calcite Lake, and into Gowganda, up crops our friend again. You don't need to be reminded that M. J. O'Brien has been working there on some of the richest silver veins in history.

"We continues our pilgrimage west again across Gowganda Lake, through Hangingstone, across the Wapoose, and as soon as we hit the iron formation at East Shining Tree, we likewise hit a likely-looking bunch of silver veins, and only that transportation is wrong, there might of been a different story to tell about it.

"When gold begins to get fashionable, we maunder west again along the belt hunting for the Iron Formation, and sure enough we run into it and some gold veins at Wasapika in the West Shining Tree country. Then we pay Porcupine a visit, just to compare notes, and we find the country up there's pretty much the same as the Grassy River country,—just lousy with Iron Formation. After Porcupine we jog along down to Kirkland Lake, and there she is again, occupying a front seat right along 'The Break.' And now Cyril Knight tells us (which same we was reading in the *Canadian Mining Journal*) that she's again doing business up in the Lightning River.

"Now, how can a fellow help getting suspicious about this Iron Formation? And, fellows, I got a hunch that some of the Big Four, (Miller, Knight, Burrows or Hopkins), will be solving the Golden Mystery by blaming it on the Prospector's Friend, THE IRON FORMATION."

The mineral resources of Northern Rhodesia are as yet not sufficiently developed to determine their importance. Most of the 290,000 square miles of this territory, north of the Zambezi river, is difficult of access, and a large part of the mineral-bearing zones is covered with detrital material. Nevertheless, the ores of copper, tin, lead, zinc and vanadium have been found in important amounts. It is considered by competent observers that Northern Rhodesia is one of the most promising mineral areas in the world for the skilled prospector.

LETTERS FROM READERS

The English Feldspar Trade

To the Editor, Canadian Mining Journal
Sir, —

I was interested in your editorial in the December 15th issue of the Journal on "Feldspar for Great Britain." As you said, Mr. Spence is "patently right" in basing his discouraging statements upon the costs of rail and ocean transportation as against the comparatively low price obtainable for crude feldspar in Great Britain.

The truth of the matter is that feldspar is not now used, nor has it been used for many years, as an ingredient of the body mixtures used in the manufacture of white earthenware, bone china etc., and, as the deposits of Cornish Stone in Great Britain are very extensive, there is little chance of feldspar from this side of the Atlantic replacing it. What feldspar is used in Great Britain is sold principally to the enamel ware trade, and the required amount of material is brought in to the pottery centres from Norway and Sweden in small sailing vessels of about 200 tons capacity. These boats can deliver their cargoes direct to the mills on the canals in the Staffordshire district. Practically all the English Cornish stone or feldspar is ground wet and sold to the potters with the water still in it, or, as it is called locally, "slop." In this way the costs of producing the material are reduced to a minimum, and even though Canadian 'spar were carefully graded and ground for the English market, the ultimate selling price in England would be so high that no potter would be able to purchase it. Also, freight rates increase as the value of the material increases, so that the cost of shipping the ground material would, in all probability, be nearly double that of crude feldspar.

The Editor is apparently not familiar with the ways of the English potter, or he would not suggest that it is quite possible that the use of Canadian 'spar might be a decided advantage. The U. S. Departement of Commerce Report No. 21 compares the pottery industries of the United States, England, Germany and Austria. On page 127 it is stated that in the earthernware potteries investigated in the United States feldspar formed 14.16 per cent of the body materials. In the English earthenware potteries investigated 20.15 per cent of China Stone was used in the body materials, and no feldspar. In 1912, the average cost of China stone delivered ground in six potteries investigated was $11.40 per gross ton. In the United States the average cost of feldspar was $11.33 per net ton.

In England the small boat freight charge has not increased in the same proportion as the rail freights in the United States, so that the Cornish stone would be further entrenched in the English market.

What feldspar is now being used in Staffordshire is being laid down at the mills for approximately $10.00 per ton, and Cornish stone for approximately the same price, *ground*. Therefore, there would not appear to be much chance of changing the practice of an industry such as the manufacture of pottery in England.

Ottawa, Ont. N. B. Davis

The larger part of the world's supply of antimony is derived from mines in China, where the ore reserves are sufficient for many years to come.

Mexico is still suffering from depression in her chief industry, mining. High taxation, labour difficulties, insecurity of titles and insufficient transportation facilities, along with the low-prevailing prices of some of the metals, have contributed to this result.

John David MacKenzie--an Appreciation

BY VICTOR DOLMAGE

When on the night of December 15th life passed out of the body of John David MacKenzie, the Geological Survey lost one of the most promissing geologists it has had, the mining industry of Canada lost a most useful and effective worker, and Canada lost a noble citizen. Just a week previous he had passed through Ottawa on the way from Vancouver to Montreal, and to all appearances was in excellent health and spirits. He had come east from Vancouver, where he was in charge of the British Columbia branch of the Geological Survey, to have an operation which he hoped would permanently cure an open wound, a result of the Great War. A preliminary operation was performed which showed that conditions were better than anticipated, and there was every hope that the final operation would be successful. After the effect of the anesthetic had passed he became conscious a few minutes. However, during the sleep that followed a blood clot lodged in the brain, which produced paralysis and then death.

MacKenzie was born in Baddeck, Cape Breton Island, in 1888, the eldest in a family of four. His two brothers lost their lives in the war. His father died when he was a lad, and he was, at an early age, left to work out his destiny with the help of his own wits and the guidance of an exceptionally capable mother. Just at this time he was fortunate in coming under the influence of Hugh Fletcher, the great Nova Scotian geologist, whose influence shaped his whole future career. Fletcher employed him as an assistant, encouraged him to continue his education, and materially assisted him in this direction. But he also did what was of far greater moment in MacKenzie's life,—he created in him a fervent ambition to be a great geologist, an ambition he dearly cherished all his life, which not only guided him into his profession but was a constant source of inspiration. At the age of sixteen he went to Boston and while supporting himself, studied in night school until he was able to fulfill the requirements of entrance into the Massachusetts Institute of Technology. He took the mining engineering course with the geological options, graduating in 1911. He spent the following winter at Cornell University in the position of instructor and graduate student. The following winter he returned to his Alma Mater to hold a similar position, and remained there till he completed the requirements for the degree of Doctor of Philosophy early in the Spring of 1916, when he joined the Nova Scotia Highlanders for service overseas.

Throughout the course of his education he spent all his summers in the employ of the Canadian Geological Survey, first as assistant to Fletcher in Nova Scotia, then as assistant to C. H. Clapp on Vancouver Island. In 1912 at the age of 24 he was given charge of work in the coal fields of the Eastern Rockies. 1913 and 1914 were spent in working out the difficult geology of Graham Island, the results of which work formed the basis for his doctor's thesis. The season of 1914 was one of the most strenuous of his pre-war days. The geology was difficult, outcrops were rare and it rained most of the time. Day after day he spent wading up the many small streams of the island in the pouring rain, surveying and doing the geology as he went. The same summer he narrowly escaped death by a gas explosion in an abandoned coal mine, and in August of the same year he and his party were shipwrecked on the Butterworth rocks about halfway between Graham Island and Prince Rupert and an anxious night was spent in the life boats. The season of 1915 was spent in the Telkwa district of north central British Columbia.

MacKenzie's efforts in the war, as in all his undertakings, were crowned with success. He attained the rank of acting Major and on August 10th, 1918, was awarded the Military Cross in recognition of his gallantry during operations east of Rosieres-en-Santerne. Three weeks later he was severely wounded, a piece of shrapnel passing through his left lung, causing the wound that finally resulted in his death. So serious was this wound that his recovery, even though slow and tedious, was regarded as almost miraculous. There is no doubt that it was partially accounted for by his wonderful spirit.

Shortly after his return to Canada he was transferred, much to his own satisfaction, to the military hospital in Esquimalt where his condition improved rapidly. Then followed the three happiest years of his life. While convalescing at Esquimalt he spent much of his time sailing his small sloop about the harbour. In the Spring of 1920 he rejoined the Survey and was put in charge of the British Columbia office. He was able to undertake and successfully complete a piece of field work on the limonite deposits of Taseko Lake district. During the same summer he married Mary Isabel Lord of New Westminster, who also served overseas with distinction as a nurse in the Canadian Army Medical Corps.

The summer of 1921 and 1922 were spent in doing a valuable piece of work on the Vancouver Island Coal fields. During these two years he made great strides towards the goal of his ambition. Owing to his long absence overseas and to the fact that he had never been but a temporary employee of the Survey, and had not even resided in Canada since he was a boy, he was almost a stranger when he took charge of the British Columbia office in succession to Mr. Camsell. Nevertheless, during the two and a half years that followed he not only completed two excellent pieces of field work with their attendant reports, but he published several other articles, gave many lectures, did a vast amount of work for the Canadian Institute of Mining and Metallurgy and gained a very high place in the respect and esteem of the mining public of British Columbia.

The following bibliography is a record of his work, and speaks for itself:—

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The Historical and Structural Geology of the Southernmost Rocky Mountains in Canada. — Read before Royal Society of Canada, May 1922.

As a geologist MacKenzie's future seemed to be particularly bright. From the very first he showed promise. As a student he was endowed with an excellent memory and a quick perception, but always preferred history and literature to mathematics, and the natural to the exact sciences. His eight years of hard training at Boston Tech. and one year at Cornell University, together with his excellent field training under Fletcher and Clapp, gave him all that could be desired in the way of preparation for a life work. Added to this there was his great natural industry. He worked long hours and he worked at a high rate of speed. Only on rare occasions was he known to arrive at his office in Tech. later than eight o'clock. Even physically he was specially adapted to the work of a geologist. Standing well over 6 feet and of slight build, he was able to travel in the woods at a rate which few, even skilled woodsmen, could equal, and that he habitually did travel at that rate is well known to his assistants.

But probably his greatest asset as a geologist and that which more than anything else would have raised him into highest ranks of his profession was his devotion to the science, and that fervent ambition created in him by Fletcher, that dream of his boyhood which ever goaded him on to greater efforts. He not only read with avidity the works of all the great geologists, but had acquired a remarkably intimate knowledge of their biographies and of the history of the science. Hutton, Lyell, Huxley, Dana, Suess — these were his household gods.

As a man among men MacKenzie was unusually well liked. He had fine instincts, a wide range of knowledge outside his own science, with definitely formed opinions on many topics and an extraordinary sense of humour. There was much of the romantic in his nature, and a large share of sentiment. He was capable of feeling deep sympathies and forming warm affections, and had a patriotism so intense that it was to him at times almost a burden. His voluntary enlisment meant a great sacrifice. It meant the giving up of his dearest ambition just at a time when the chance of satisfying it began to seem possible; it meant throwing away the long, hard and valuable training that he had gained at such great cost and endeavour; and he had to leave many close friends. He gave up all these to take up a task he admittedly dreaded, because he believed it was his duty.

The last few days of his life were busy with finishing the various pieces of work he had on hand, and not the smallest detail seems to have been omitted. While on the train on his last trip east he wrote a short argument based on his own experiences proving that the actual passage from life to death is a painless process owing to an intermediate state of unconsciousness. The care with which he completed all his tasks and the impulse that caused him to write this discourse give us an inkling to some other thoughts that may have occupied his mind. As he sped eastward through the mountains he loved so well, and came out of the mountains into the foot-hills; as he crossed the great Lewis overthrust and came on to the Cretaceous rocks of the plains on which he did his first piece of independent geological work, and passed the structure of those rocks on which he had written almost his last scientific article, no doubt his keen and well-trained eye was once again occupied in reviewing those geological features; no doubt they again drank in a full share of their natural beauty; no doubt he loved those scenes that meant so much to him. It may be as he passed along that he thought he might not pass that way again. But he did not fear death.

Dr. Camsell has paid him this tribute:

> "John MacKenzie was one of the finest characters it has been my privilege to meet, — a character all too rare, and one that Canada or any other country can ill afford to lose. Irrespective of his high scientific training and attainments, which are undoubtedly a serious loss to our country, a far more serious loss is the leavening influence of such a character on the moral life of the nation.
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> "It is easy to believe that the world is better for MacKenzie having lived, and the influence of his character will long remain with those with whom he was associated in the Geological Survey and the mining industry of Canada".

This tribute came from Dr. Collins, Director of the Survey:

> "MacKenzie was another of that small and mysterious band, touched with the seemingly tragic gift of genius, whom the gods love to take to themselves early. He was still young and had given generously to other needs of his country; nevertheless, he had already proven by his works as a geologist that he possessed that happy and uncommon combination of powerful imagination and capacity for exact and unstinted observation that is fundamental in all great scientists. In his death the Geological Survey has suffered an inestimable loss."

The following tributes come from two of the great teachers under whom he was developed from a raw recruit to a finished geologist, who knew best his liabilities and for whom he had a great affection. Reginald A. Daly sends this message.

> "MacKenzie was a practical idealist. His high quality early declared itself to us who knew him during the years of his training in geology. His professional success was due to an extraordinary will driving a fine intelligence. Fighting for his country through much of his mature life, MacKenzie could not fully show his scientific power so well known to his friends. Canadian and American geologists cannot but regret the heavy loss to their profession while doing homage to the man's nobility proved to the uttermost".

Waldemar Lindgren says:

> "From our geological section and from myself add this message. Our sorrow is deep that John D. Mackenzie has passed away. We knew him as a scholar of greatest ability, as the fellow instructor

Coal Dust in Winter

DURING COLD WEATHER INCOMING AIR CURRENTS MUST BE HUMIDIFIED TO AVOID DISASTER

By JOHN MOFFATT

It is generally admitted that coal dust explosions are more liable to occur in winter than in summer. The cause is well known and arises from the change in the mine atmosphere, due to the drying-out process continually going on when the temperature falls below the freezing point. The colder the weather and the harder the frost, the greater effect it has on the mine air, and within a few days a coal mine that had hitherto been comparatively safe with one hundred percent saturation of its atmosphere, becomes a place that requires immediate attention if a catastrophy is to be avoided.

During the summer months the temperature within the mine usually differs little from that outside—if anything it is lower and for that reason air entering by the intakes begins at once to give up its moisture, thus adding to the humidity of the mine. But when the frosty winter winds dry up the air that enters the warm mine, it begins to expand and to take up moisture, which it carries out of the mine, leaving it dry, dusty and dangerous. Robbed of its moisture, the quickly moving currents dry up the wet places, draw all dampness from the strata and from the coal, leaving no source of moisture from which they can become again saturated in their onward course to supply workmen with fresh air and relieve the mine of its foul breath.

Danger from Coal Dust

Coal dust, which is always floating in the mine to a greater or less extent, but which in a humid atmosphere becomes damp, rapidly accumulates under dry conditions and in these days of high-velocity air currents of great volume, the dust is distributed through the working parts of the mine. It collects on the floor, the walls and roof; on the tops and hidden parts of timber; on debris; on everything stationary, and becomes a standing menace to the safety of the mine. The change may take place slowly or it may take place in a week or less time and may generally have been unobserved. This makes the danger all the greater. Silently and stealthily the underground workings of a great colliery can be transformed from a safe condition to one of imminent danger. The explosion records of the past furnish ample evidence of this statement. The miner usually goes about his daily task, ignorant of what is going on around him. It may be that he notices that the dust in his section is lighter and drier and in greater quantity that before, but he attributes this to the greater depth of the mine and its advanced workings, or he may, in his matter of fact way, accept it as a natural condition to be expected, hence he is not alarmed over it.

But the observant Mine Manager has his eye bent on the change going on around him. He notes the pillars of cloud as the rapidly moving trip or the mine cars drawn by the pit horses pass on. He sees the bone-dry state of the mine and reads in it the signs of threatening disaster. He has his finger on the pulse of the mine and through the hygrometer readings day after day he can tell how near the mine is to the danger limit. All this time he has, no doubt, been getting ready to meet the change he saw coming and in a few days the walls of the mine are wet again, all coal dust becomes damp and danger is greatly lessened through the use of water sprays in the main airways.

The Ventilating Fan as Water Pump

The amount of moisture carried out of a coal mine in frosty weather is surprising. Records taken in some of the collieries in Nova Scotia range all the way from one-half gallon per 1000 cu. ft. of air to nine gallons. If the colliery is a large one with the volume of air passing at a velocity of 250,000 cu. ft. per minute, the amount of moisture carried out at the average temperature of the mine will be 160 tons per day. In one week no less than 1,120 tons of water will be carried out on the wings of the wind, and in the three frosty months of winter the mine will be relieved of 14,000 tons of water—much to its detriment.

The hygrometer for measuring the humidity of the mine atmosphere is a part of the equipment of all well regulated mines and daily readings are taken and recorded. Where conditions are found to be gradually becoming drier, other measures of safety are taken besides water sprays. In one of the largest collieries of Nova Scotia a wet zone has been formed. This is simply a district surrounded on the upper and lower sides by water. This water is held in the levels above and below this particular section of the mine. It is a comparatively easy thing to accomplish, as most of the lower levels of a coal mine, except at great depths, yield a considerable amount of water, and this can be trapped in the levels where it is required to be used.

Use of Hygrometer

In these days of free mining schools, technical training and the use of the latest devices in mine work, no one should be easily deceived as to mine conditions. If the roof and sides of the roadways are damp, it is sometimes taken for granted that this is the natural condition of the mine and that this moisture has all oozed out of the rock and the coal. No greater mistake can be made than to think along this line, without first having made personal investigation. A close examination at different seasons of the year is necessary to find out the natural condition of any coal mine. There is much evidence in a coal mine to cause a mine manager who is not observant and of studious habits to conclude that his mine is inclined to be wet, while the truth is just the opposite. A mine may, through its pumps, pour out ten, twelve, twenty or a

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of infinite patience and skill, as a gentleman in the finest sense of the word, and as a trusted and true friend. He left us to take up arms for his country, and he died for it too. Had he lived he would have ranked with the highest in his science. We honour his memory."

hundred tons of water for each ton of coal produced, but that does not make it a wet colliery. The inner workings may be dry and the apparent "sweat" on its sides may be carried in by the mine atmosphere and left there. In the face of the hygrometer readings, skeptical managers may prefer to believe otherwise. But the practical, well-trained mine manager knows better and when the wet bulb readings give indication of low moisture in the mine air he is fully alive to his duties. Especially if his colliery is a gaseous one, he knows the increased danger of a large or even small percentage of coal dust in the atmosphere. Indeed, the mine manager of today has more dread of coal dust than of gas. The gas is diluted and carried out of the mine in the air currents, but coal dust collects everywhere and if not sent out of the mine in the pit box soon forms a combustible covering just as dangerous and far more deadly than the train of powder sometimes laid and used for ignition purposes in blasting.

Methods of Humidifying

Various methods of humidifying the air have been tried, but the one in common use today is that of water sprays. Steam was tried, but owing to the expense and its injurious effect on the mine roof and floors and on mine timber it was discarded, being found to be neither practical nor economical.

In installing the system of spraying one of the important things is to ascertain where the first spray jet will be placed in the intake airway. As air below freezing temperature carries little moisture, the thermometer will indicate the point where air expansion begins and where the air has been sufficiently warmed to take up moisture. Here a small water jet may be thrown into the air and this part of the airway being far enough away from the working districts to ensure absolute safety in case of an explosion, the effect of the small amount of moisture supplied will be sufficient for that particular section. The same principal is used as air becomes further heated, and spray jets are placed at points along the airway as their use may be indicated by temperature readings. In this way, perfect saturation or super-saturation of the mine atmosphere can be had, and the safety of the mine against dust explosions ensured.

The Richardson feldspar quarry, in the Verona district of Frontenac county, north of Kingson, Ontario, is shipping feldspar once more. A new spur railway and a good automobile road have recently been completed to provide cheap transportation from the property. It is being operated by Mr. R. F. Segsworth; 103 Bay Street, Toronto.

The United States Geological Survey's estimate of beehive coke production in 1921, made in March, was substantiated by final returns from the producers. These reports show that the total output was 5,538,042 net tons, the smallest record since 1885 and 73 per cent less than in 1920. By-product coke continued to supersede the beehive oven variety, and of the 25,287,22 tons of coke produced in 1921—both beehive and by-product—but 22 per cent of the total came from beehive ovens against 40 per cent in 1920.

CLAY PRODUCTS - 1921*

Of the 343 operators of clay deposits and producers of brick in Canada, only 199 carried on operations during 1921, the remainder being idle. The total value of the clay products made during that year amounted to $6,296,171 which was divided among the various provinces as follows: Nova Scotia $139,390; New Brunswick $26,300; Quebec $1,257,562; Ontario $3,800,858; Manitoba $208,982; Saskatchewan $166,244; Alberta $280,956, and British Columbia $415,869. The disposition of the known establishments and the value of production is shown in the following table. Ontario's production exceeds that of all other provinces combined by a considerable margin.

Province	Number of Establishments Active	Idle	Total	Value of Production
Nova Scotia	6	4	10	$ 139,390
New Brunswick	4	2	6	$ 26,300
Prince Edward Island	...	1	1	$ .....
Quebec	18	18	36	$1,257,562
Ontario	140	84	224	$3,800,858
Manitoba	5	10	15	$ 208,982
Saskatchewan	7	6	13	$ 166,244
Alberta	10	7	17	$ 280,966
British Columbia	10	11	21	$ 415,869
TOTAL FOR CANADA	199	144	343	$6,296,171

The principal producing countries of the maritime provinces were Pictou, Hants and King's in Nova Scotia, and in New Brunswick, York and Northumberland Counties, with smaller producers in Gloucester and Carleton. The individual values of production range from $4,000 to $43,000 per annum.

There are some large companies producing over $100,000 worth in Quebec, notably in La Prairie and Montmorency Counties. Other deposits in L'Islet, Sherbrooke Joliette, Quebec, Richmond and Champlain produced lesser amounts, ranging from about $4,000 to $30,000 worth per annum.

Ontario is by far the most important producing province in Canada. The extent of the industry may be approximately gauged in this province by selecting only those companies producing $10,000 worth or over and tabulating the values by counties.

Kent	$ 80,149	York	$1,685,298
Essex	102,941	Carleton	354,100
Lambton	74,521	Perth	
Middlesex	66,985	Peterboro	56,293
Grey		Prescott	
Waterloo	52,900	Frontenac	113,400
Oxford		Renfrew	75,483
Wentworth		Nipissing	
Lincoln	286,077	Algoma	84,175
Halton	478,379	Thunder Bay	
Peel	482,359		

In the western provinces, five Manitoba establishments averaged about $40,000 each; in Saskatchewan the average was about $24,000, Alberta about $30,000 and British Columbia in the neighborhood of $42,000. The total value of the production for the prairie provinces was $656,192 from 22 companies, and in British Columbia the value was $415,869 from 10 companies.

* Data provided by Dominion Bureau of Statistics.

Recently an important part of the Roumanian oil fields passed into the control of the Phoenix Oil and Transport Company, a British corporation. It is predicted in some quarters that the new combined company will rival in importance the famous Shell group.

A Budget From New York

BY KIRBY THOMAS

The Mining Revival in the Comstock and Goldfield District of Nevada

The Comstock district in Nevada was the scene of the first great mining boom in this country following "the days of old — the days of gold" in California. The first activities began in the '60's, and for nearly twenty-five years the district held the front rank in interests and in fabulous yield of the precious metals. In a few years the Comstock mines produced nearly a billion of dollars of gold and silver making many notable individual fortunes and profoundly affecting the development of the whole west. Then came the decline in the price of silver and the mines in depth yielded, at great cost, ores not amenable to the metallurgical processes of the day. Comstock sank into somnolence and to the present generation it became only a hectic, glorious memory. Several sporadic attempts to revive the operations in the district during recent years, were unsuccessful, partly because of insufficient capital, but chiefly because of the limited vision of their sponsors and the inadequacy of their program. Within the past two years new men and new interests have come into the Comstock story.

A financially strong group headed by Mr. Harry Payne Whitney of New York and technically directed by Mr. Bulkley Wells of Denver, acquired a large sector of the district and after extensive and expensive development, a mill of 2,000 tons daily capacity has been completed and has recently been put in operation, treating at a profit ores that were profitless to the earlier miners. The mine development, directed by skilled geologists, has disclosed large tonnages of new ore of very good grade. The activity and success of the undertaking in the old Comstock mines has led to a general revival of activities in the district and a new, large project has just been adequately financed to undertake even more extensive operations.

It is generally accepted now as a fact that the old Comstock district has come back and that it will again rank high among the sources of the country's needed supply of the precious metals.

In the same state a later comer among the great and sensational mining developments of the west — the Goldfield district — is also "coming back." This district was not discovered until 1902. In a little over ten years it yielded more than $100,000,000, mostly in gold, and paid more than $50,000,000 in dividends. Goldfield was a district of "bonanza" orebodies and the stories of the Aladdin results of the operators and lessors during the earlier years of the activities of mines of the Goldfield district are still too fresh in mind to require record. All too soon the rich orebodies were exhausted by the fevered and frantic efforts of the numerous companies formed to participate in this, the greatest gold boom of recent times. The companies improvidently failed to provide for exploration and development against the inevitable exhaustion of the "bonanzas", and the general financial stringency that overtook all development and speculative undertakings for nearly a decade past has made of Goldfield almost a deserted camp. However, there were those that had faith and vision and among them was Mr. George Wingfield, one of the beneficiaries of the boom days of the district who later became the responsible head of the district's greatest mine, the "Goldfield Consolidated Company". Mr. Wingfield and others associated with him, through several years untangled the affairs of the derelict companies and recently they have formed a company with strong financial backing to undertake a notable exploration program for the district. Operating as the "Goldfield Deep Mines Company" and owning more than 600 acres in the heart of the district, the company is actively sinking a great shaft to cut the main gold veins of the district at a depth of 2,400 feet. Most of the production from the district was from relatively shallow workings, none deeper than 1,400 feet. The new shaft will open the veins much below these workings and at a zone considered by the company's geologists and engineers to be favorable to the enrichment of the veins.

Several other companies in the Goldfield district have been stimulated to undertake developments on a larger scale, and it is likely that Goldfield will soon "come back", as has the earlier Comstock district.

WORLD'S LARGEST ROLLER-BEARING

The largest roller-bearing in the world is reported to be on exhibit at the Motor Show in London, England, before its shipment to Canada. It is four feet high, weighs more than a ton, and is of the chain type, like those recently tested by the British Railways. This giant bearing, and two others like it, will be installed in a Canadian pulp mill.

Large tube mills, with a capacity each of 600 tons in 24 hours, have been installed at the Spring Gold Mines, South Africa.

A new process for the production of magnesium metal by electrolysis at a low temperature has been worked out. A fused mixture of magnesium chloride with the chloride of sodium or potassium is electrolysed and the liberated magnesium alloyed with lead, in a bath beneath. This alloy is electrolysed, giving pure magnesium and renewing the lead for further use.

The principal use for fluorspar is as a flux in open hearth and electric furnaces, there being no satisfactory substitute for it for this purpose.

A recent survey of coal deposits in South Africa shows them to be of first rate importance. It is predicted, with good reason, that eventually they will prove of greater value to the country than the famous Rand gold mines.

There is a movement on foot in Britain to form a combination of iron and steel interests similar to the Steel Corporation of the United States.

An Iron and Steel Industry For British Columbia

OPTIMISTIC REPORT BY AN ENGLISH ENGINEER WHO HAS EXAMINED THE FIELD ON BEHALF OF THE BRITISH COLUMBIA GOVERNMENT

BY ROBERT DUNN

Below is a resumé of a report on the economic possibility of establishing an iron and steel industry in British Columbia at present. Mr. Williams, an English engineer, has spent the past season in gathering data, and his conclusion is most favourable to the immediate erection of a plant. His examinations have disclosed no new facts, so that his difference of conclusion from the engineers that have examined the case previously must rest upon his opinion. We should not care to accept the sweeping generalizations included in his report without a searching analysis of his data and of his deductions. Meantime, the report throws an interesting side-light on the problem. — Editor, C. M. J.

That an Iron and Steel Industry can be established in the Province:

That the necessary materials for the successful working of such an industry are available:

That there is a good and increasing market for the product:

That the time for the launching of such an industry is opportune at present:

That the enterprise should be most successful:

These are the conclusions reached by Mr. C. P. Williams, the English mining engineer, engaged by the Hon. William Sloan, Minister of Mines, to make a thorough investigation into the tonnage possibilities of the iron ore deposits of British Columbia and other iron ore bearing zones on the Pacific Coast as far south as Mexico and as far north as Alaska. The object was to endeavour to obtain such data that it might be clearly established either that full-sized iron and steel furnaces situated in this Province could or could not be maintained by material obtained on this Coast.

Mr. Williams' Training and Experience

The satisfactory nature of Mr. Williams' report from the standpoint of those desirous of seing such an industry launched is emphasized by the fact that Mr. Williams is one of the best qualified authorities that has yet investigated his question. After graduating from Victoria University, Manchester, he took a course in engineering with Messrs. Pearson and Knowles, of Warrington, one of the best known firms in Great Britain. Later he joined the designing staff of the Ebbw Yale Coal, Iron & Steel Co. when they were constructing their then new Bessemer plant and blast furnaces. From there he went to Germany, becoming an engineer with the Hoesch Co., Dortmund, one of the largest firms of coke and by-product producers and iron and steel manufacturers in that country. Coming back to England, he was engaged by the Brynbo Steel Company where under his direction extensions were undertaken that proved of immense benefit. During the war he occupied the post of Assistant General Manager to John Lysaght, Ltd., and under his management the company was the only British concern to successfully produce a bullet-proof alloy for armoured tanks. It will be recognized therefore that Mr. Williams both by technical training and by years of practical experience is well qualified to discuss the iron and steel problem in its relation to this Province.

"From my experience", Mr. Williams says, "in several European countries and from an inquiry into costs at a few eastern American works I am of the opinion that iron and steel can be manufactured on the Pacific Coast today as cheaply as in any of the well known iron and steel producing countries of the world, excepting Germany and possibly Belgium. The reason for their advantage is not that their costs of production *per se* are lower but that the present abnormal rate of exchange leaves the countries with a depreciated currency in a better position to export their finished articles than those countries whose rates of exchange have not fluctuated considerably from normal conditions.

"Again, there is every probability that an approximately proportional fluctuation in cost will take place in most of the world centres of the industry, with the result that as the conditions today in British Columbia compare favorably with conditions in other regions producing these goods, so will they compare equally favorably when costs of production elsewhere have decreased and conditions become more stable and normal all over the world."

Alternative Sites for Iron and Steel Plant

At this point Mr. Williams makes a statement of rather more than ordinary interest. He says that it is possible to outline for this Province not one iron and steel project only but several, each of which, in his opinion, eventually would become of very great importance. "All the conditions," he asserts, "are now present for establishing such an industry on a successful commercial basis. It is possible to sketch a plan for such a work at a suitable site on Vancouver Island and also one on the mainland near the coast." As between these two locations, however, a preference is expressed for a site on the Fraser River. On this point he says, "With respect to the location of the works and with due regard to the areas I have visited, my opinion is that the first iron and steel works of the Province should be on the Fraser River."

In supporting this contention Mr. Williams explains that there are economic factors involved such as the importing of certain material and commodities and the exporting of certain finished manufactured goods. The greatest market is on the mainland and he argues that to avoid heavy transportation costs and to reduce double handling to a minimum this site is to be recommended. All interior markets could be reached by rail and the position would be suitable for all coastwise and overseas export trade. Here suitable coking coals from the Nicola Valley, from the Comox district of Vancouver Island, or even, if it were necessry, from

the Crow's Nest coalfield could be assembled. Limestone could be brought in scows from the north end of Texada Island.

The Iron Ore Deposits

Discussing the iron ore deposits, the investigator states that there are suitable ores at different points in the eastern portion of British Columbia. He mentions the deposits of Kitchener, and Sand Creek near Fort Steele, that of Ironton opposite Proctor near Nelson, a large body near Rossland, one at Keremos, one at Bull River, and the International property near Waneta. In this region there are red and brown haematites, specular ore, and magnetites which if properly selected would make suitable mixtures for blast furnace operation. Limestones of good quality and ample in quantity are present. In this region also is found quartzite for manufacturing silica bricks. There is an abundance of water power, and the Crow's Nest Coalfield is within reasonable economical distance from a central point that could be decided upon as the operating centre to assemble and convert these minerals into finished iron and steel goods.

It is stated that the Prince Rupert district is worthy of every consideration and that the iron ore zones of that part of the Coast should have minute consideration. The Louise Island deposit is thought to be of special importance, and Mr. Williams attaches a special report on that property. It consists of four claims, two of which have been developed by numerous large and small opencuts, as a result of which work it is said to be probable that the area is altogether underlaid with ore without any intervening country rock. Ore from this source, it is suggested, might be made the basis of the undertaking, the product being supplemented by ores brought from a distance.

Ore on Pacific Coast in Mexico and Oregon

In this connection reference is made to two other important ore fields outside the Province, one a large deposit at San Vicente on the peninsula of lower California, Mexico, and the other an important soft ore field, rich in iron and very easily reduced, which has recently been discovered in the neighborhood of Portland, Oregon. Exploration and development work now is being actively carried on in this region.

That there is a great opportunity for an iron and steel industry on the Coast is declared by Mr. Williams to be shown by the following facts: On the shores of the Pacific Ocean there is a large population, little competition, highest priced iron market in the world, the necessary raw materials of superior grade, water transportation, immense water powers, and an excellent climate.

He concludes by affirming that British Columbia's possibilities as an iron and steel production centre have impressed him and that there now is an unparalleled and unique opportunity for whoever is first in the field, whether the project be undertaken under the auspices of the Government or by private enterprise.

The body of Mr. Wiliams' report is taken up by detailed statements regarding the character of the iron ore deposits visited, the economic suitability of the ore of the Coast and of the Interior, the coal deposits of British Columbia, the cheap and abundant electrical energy available and the limestone and other material available for fluxing and refining purposes. The question of the markets also is discussed and Mr. Williams concludes from the information available to him from various sources that there is a sufficient demand to absorb the output of a good-sized plant.

Mr. Williams and his assistants visited iron ore deposits in the following districts: Harrison Lake, Gordon River, Texada Island, Alta Lake, Queen Charlotte Group, (Louise Island), Burnaby Island, Fanny Bay, Kamloops, Seymour Inlet, Waneta and district. They examined limestone on Texada Island and went into the coal supply question in the Crow's Nest and Nicola Valley regions. Exhaustive reports are appended on all the iron ore deposits seen and some interesting notes are given dealing with the coal supply of the Province.

Coking Coal and Hydro-electric Power Available

Regarding the coal it is stated that there can be no doubt as to the coking qualities of the coal of Nicola and the Crow's Nest. Not only can the coke be produced but the coals lend themselves readily to by-product oven carbonisation resulting in a good coke and high residual yields. Only one adverse criticism is made, and that is, that compared with the best fuel the ash content is occasionally somewhat high, but it is not too high for the successful smelting of high grade ores containing often 64 per cent. or even a higher percentage of iron.

Concerning water powers, Mr. Williams says: "In a country like British Columbia, where abundant electrical power can be obtained from the numerous and plentiful water falls that are such a feature to the Province, it would be advisable, wherever possible, to drive most of the machinery from such source of power. This would guarantee an almost uninterrupted operation of the different sections of the works and would bring about the utilization of the spare gases from the coke oven and blast furnace plants for steel smelting and for re-heating ingots and blooms, thus obviating the installation of costly electrical generating plants and also the erection of large batteries of gas producers. There are very few iron and steel concerns in the world that are the fortunate possessors of such sources of hydro-electric energy in addition to plentiful supplies of high-class coal."

An approximate estimate is given of the cost of establishing an iron and steel works capable of producing 125,000 tons of pig-iron per annum and 120,000 tons of finished steel. The total, exclusive of the cost of purchasing properties and of the cost of coal mining equipment, is placed at $15,592,000. It is figured that it would take four years before a plant of this magnitude could become productive and revenue producing, so that the capital expenditure referred to would be spread over four years approximately as follows: First year, $2,000,000, second year, $3,600,000, Third year $5,000,000; fourth year, $4,992,000. These calculations are given with the explanation that an accurate estimate of cost of plant without obtaining actual tenders is impossible when prices are fluctuating as now is the case. It is thought likely that there will be a reduction in the near future in the market prices of the materials required, so that a reduction in the estimate may be expected.

The United States consumes about 22,000 million gallons of petroleum annually, against 1,400 million gallons for Great Britain and another 1,500 million gallons or so for the rest of the world. Canada's share is about 100 million gallons.

Arsenic in the U. S. During 1922

OUTPUT REPORTED BY THE UNITED STATES GEOLOGICAL SURVEY

The production of refined and crude arsenic in the United States in 1922, according to an estimate by V. C. Heikes, of the United States Geological Survey, amounted to 10,947 short tons. The sales of crude arsenic amounted to 1,366 tons. All the crude arsenic sold was used in making sodium arsenate, a weed killer, either at the place of manufacture or at places nearer the consumer. The production of refined white arsenic having a purity of 99.5 % or more amounted to 9,581 tons, valued at 1,486,000, or 7 3-4 cents a pound. The stocks of domestic arsenic on hand October 1 were reported as 1,230 tons, and the quantity to be made between October 1 and May 1, 1923, was estimated at 3,400 tons.

All Kinds of Arsenic and Uses

The largest users of refined arsenic are the manufacturers of insecticides, who began to buy it in quantity during October, while the prices were rapidly rising. Most of these manufacturers that reported to the Survey used the greater part of their purchased domestic and foreign arsenic in making lead arsenate. In 1922 about five times more lead arsenate was made than all the other arsenical compounds put together, including calcium arsenate, Paris green, and Bordeaux mixture. The reports indicate that during the period from October 1, 1922, to May 1, 1923, the output of calcium arsenate will be larger and that of lead arsenate may be somewhat smaller than heretofore. The makers of plate glass bought their usual quantity of refined arsenic, about 1,000 tons.

Manufacturers

Six western smelting plants that handle copper and lead ores and are equipped with arsenic refineries made white arsenic, crude and refined, in 1922. The American Smelting and Refining Co., which operates the plants at Globe, Colo., and Tacoma, Wash., reported the largest output. The Anaconda Copper Mining Co. had some difficulty in getting sufficient labor to operate at greater capacity its ore-reduction plants at Anaconda, Mont., but reported the second largest output of refined arsenic and the largest output of unrefined arsenic. At the plant of the United States Smelting, Refining and Mining Co. at Midvale, Utah, the output consisted of refined white arsenic, of which a normal quantity was sold. All the company's crude material was worked up into sodium arsenite solution, many thousands of gallons of which was distributed to railroad companies for killing weeds on rights of way. this weed killer is also made in large quantities by the Chipman Chemical Engineering Co., which purchases crude arsenic for shipment to several of its plants in eastern and western States.

Prices

The price of white arsenic in New York in 1922, as quoted by the Oil, Paint, and Drug Reporter, ranged from 6 cents a pound in January to 15 1-2 cents a pound in December. In July the price was 7 3-4 cents, in August it suddenly jumped to 8 1-2 cents a pound, just as the manufacturers of insecticides decided to buy, and it rose rapidly until December. The average price per pound to consumers, however, seems to have been between 7 and 7 3-4 cents, and the maximum price for wholesale lots is understood to have been 8 1-2 cents. Contracts were said to have been made in October for German and Japanese arsenic, to be delivered in November and December, at 9 1-2 to 10 cents a pound, but dealers predict still higher prices at the beginning of the insecticide season, next spring. Lead arsenate, as paste, was quoted at 8 to 14 cents a pound. But arsenic was quoted at 12 to 13 cents a pound, and the quotations on calcium arsenate ranged from 11 to 20 cents a pound and at the end of November 10 to 12 cents was bid. Elemental arsenic was quoted at 17 cents a pound.

Increased Use for Killing Weeds and Insects

The use of arsenic in the United States and abroad in weed-killing compounds has increased during the last year. In the Southern States the cotton-boll weevil is being fought with calcium arsenate, of which about 8,000 tons was distributed to the cotton growers in 1922. According to reports received at the Delta laboratory of the United States Department of Agriculture at Tallulah, La., no calcium arsenate remained in the warehouses after September. B. R. Coad, in charge of that laboratory, reports that the demand for calcium arsenate in 1923 is expected to be twice as great as in 1922. The use of arsenic as a larvacide in mosquito-control work is being extended in the malarial region of the South.

Cause of Shortage of Supply

Though the unusually large demand for arsenical compounds for use as insecticides is doubtless the principal cause of the shortage of arsenic there are a number of other causes. Among these are the reduction in the quantity of copper ores treated at Anaconda, Mont., and at Tacoma, Wash., the small supply of arsenical dust from the lead smelters in Montana, Utah, and Colorado, and the decrease in the imports from Canada, Japan, and Mexico. The present demand for arsenic amounts to 12,000 short tons a year, whereas the supply available in 1921 from both domestic production and imports amounted to only 6, 455 tons.

Some New Developments

The arsenic plants at smelting works in the United States have an annual producing capacity of 18,300 tons of white arsenic, but their actual output must depend largely on the plans of two smelting companies that contemplate reducing ores and speiss directly for their content of arsenic. At Toulon, near Lovelock, Nev., arsenical ores were reported to have been successfully treated and to have yielded some white arsenic in 1922. The owners of this plant expect that it will produce considerable arsenic in 1923. The American Arsenic Co., at Gold Bar, Wash. was producing red arsenic, (realgar) in commercial quantities in 1922, according to a report from the company's engineer. The milling plant on the property has been equipped with a flotation unit and turns out over a ton of powdered realgar a day. The Salt Lake Insecticide Co. is erecting at Salt Lake City a plant for making arsenical compounds directly from ore. The owners estimate that the plant will make a daily output of about 15 tons of calcium arsenate. All the ore to be treated is to be mined at Gold Hill, Utah, from the largest known deposit of basic iron arsenate in the United States.

Two large, new generators are to be added to the hydro-electric plant at Victoria Falls on the Zambesi River, Africa, to supply the increasing demand of the Rand gold mines.

DEVELOPMENTS IN THE MANUFACTURE OF TITANIUM DIOXIDE

A Competitor of White Lead

It has been known for several years that a white titanium pigment was being manufactured in America (BXX Titanox of the Titanium Pigment Co., Niagara Falls, N. Y.) and in Norway (the "Kronos" titanium white of the Titan Co., A S. of Fredriksstad). Particular attention has been directed to these titanium white pigments by the appearance of two papers—one titled "Titanium White: Its Production, Properties, and Use," by Messrs. W. H. Washburn and J. McGougan in the Proceedings of the Paint and Varnish Society (Session 1920—21, No. 3, pp. 41 to 61); and the other, an article on the same subject, by Mr. Noel Heaton in the Journal of the Royal Society of Arts (Vol. LXX, No. 3,631, for June 23, 1922, pp. 552 to 565). There is little doubt that this new pigment has very valuable properties and an attractive future before it. It must, however, be made clear at this stage that the brands of "titanium white" pigment on the market consist normally of about 25 per cent. of pure titanium dioxide mixed with 75 per cent. of barium sulphate (barytes). In some cases, owing to the extreme chemical inertness of the titanium dioxide in the vehicle (usually linseed oil) it has been necessary to add considerable amounts of zinc oxide.

It is claimed for titanium white pigment that (1) it is of dazzling whiteness; (2) it consists of particles of exceeding fineness; (3) it is light in weight; (4) of great permanence, owing to its inertness, either by exposure to acid fumes, fierce glare, or sea water; (5) it is non-poisonous; (6) weight for weight it is said to have nearly three times the obscuring power (opacity) of white lead; and (7) owing to the above qualities it works well, spreads more evenly, and is more durable than any other white paint. The above remarks apply to "titanium white" as distinct from pure titanium dioxide. The drawback has been the great cost of this pigment, the "Standard" quality of the Titan Co. being recently quoted at £50 c.i.f. British port, packing included. The "Extra" quality, containing more titanium dioxide, is quoted at £75 a ton.

The raw materials from which the pure titanium dioxide is prepared are the minerals rutile and ilmenite. Large deposits of rutile are not common, whereas considerable deposits of ilmenite are known. For example, the beach iron sands of certain parts of New Zealand are highly titaniferous, and the monazite sands of the Travancore coast in South India contain nearly 70 per cent. of ilmenite. The quantity of ilmenite in the latter deposits is estimated in hundreds of thousands of tons. It is on cases such as have been cited above, where the ilmenite is obtained as a by-product in the recovery of another substance, that attention has been concentrated.

The question of using the ilmenite in the monazite sands of Travancore has been very carefully considered by those interested in that branch of the Indian mineral industry. They have been faced with an exceedingly dull monazite market for the past eighteen months, and there is no immediate prospect of a trade revival in this mineral. This, it appears, is due to the fact that considerable stocks of monazite exist in Germany—enough, so it is reported, to supply thorium nitrate for the manufacture of gas mantles for the next two years. The cheapness of the German incandescent gas mantles is at present proverbial, consequently the monazite producers have been looking for some other means of maintaining their business. In these circumstances the manufacture of pure titanium dioxide has presented a solution. The process, as recently devised, is simple, and requires high-grade ilmenite in large quantities, cheap sulphuric acid and fuel to make it commercially profitable. The prepared substance has already attracted the attention of dealers and makers of paints and varnishes. A great deal of work has been done, and although it is too early to disclose the developments which are in progress, it is anticipated that a well-laid scheme, involving firms of good name and strongly-entrenched position, will presently emerge. It is estimated that with the existing price of materials, wages, and assembly costs the pure titanium dioxide, which is now being prepared in a semi-commercial manner, will be available at less than £30 a ton. This price is considerably below that of white lead or zinc white.—London Mining Journal.

A LITTLE TALK ON THRIFT

By S. W. STRAUS, President American Society for Thrift

A great deal has been said and written about the value of enthusiasm, and, while we must not under estimate its place in our personal lives or in our business activities, it is well to bear in mind the wisdom of Goethe's observation, that "enthusiasm is of the greatest value, when we are not carried away by it."

Even in the matter of saving there is such a thing as being carried away by enthusiasm. The miser is an example of this. In order to save and get ahead steadily it is vital that we always keep our feet on the solid ground of prudence.

To be effective, saving must be continuous. The person who pinches and saves every possible penny for a short time and then gives up and quits, will never reach the goal of independence or success. Therefore, it is well always to have in mind the matter of moderation. Saving a reasonable amount regularly gives ever increasing stabilization and strength.

When we are strong and well we are apt to pay little or no attention to matters of health. Then if we become ill we suddenly become greatly interested in the care of our physical being and we feel that when we recover we will never again allow ourselves to become neglectful.

It is the same way regarding financial matters. In the vigor of youth or in times of great prosperity, we are apt to disregard the value of thrift. We drift along from day to day and year to year without making preparations for the future. Then suddenly some misfortune happens and we find ourselves confronted by the stern realities of financial impairment. Possibly we have lost our position through illness or perhaps the source of our income is unexpectedly wiped out. Then we think of thrift and make up our minds that if we ever become prosperous again we shall not neglect to put aside a portion of our earnings for the future.

Being thrifty does not mean that we must be an extremist in the matter of saving money or in giving up rightful pleasures. Cultivate moderation. Do not save to the point of being a miser, and to the exclusion of the various uplifting elements that should be a part of our lives.

On the other hand we must use moderation in the matter of pleasure and out of our earnings make sure that we are providing for the lean days that are sure to come

The Mining Districts

BY THE JOURNAL'S CORRESPONDENTS

NORTHERN ONTARIO

Staking Gold Claims in Quebec.— Claims totalling approximately 3000 acres have been staked in the Townships of Fourniere and Malmartie in Quebec, where several discoveries are reported to have been made. One find is understood to have a width of 20 feet. The stakings are about 60 miles east of the Ontario border and in the same general formation as that of Rouyn Township. Staking in the Rouyn district continues, despite the very cold weather. A road is now being cut from the Union Abitibi Mines, which will greatly facilitate assessment work. The most important discovery so far is known as the "Powell Vein", which is understood to run approximately $6.00.

Power from Montreal River.— It is understood that as part of the project for furnishing power to Porcupine and other camps from Indian Chutes on the Montreal River, a motor road will be construeted following the general direction of the transmission lines .This road, in addition to providing for an efficient patrol of the transmission lines, will result in opening up some promising districts and will mean a good road betwene Cobalt and Porcupine. Good progress is being made with the installation of the first units, to generate 2000 h. p. Concrete work is practically all finished and the machinery is on the ground ready for installing, and it is expeeted that it will be possible to turn over the first unit about the first of March. Following the recent underwriting of $800,000 of bonds of the Great Northern Power Cmopany, other units will be installed which will bring the total capaeity of this plant up to 6000 h.p. While the company may be able to develop 6,000 h.p. in times of high water, a good many mine managers are wondering what will happen when the water is low. Few people seem to realize that Northern Ontario has a comparatively small precipitation. Following the extremely heavy run-off in the spring, when it is impossible to conserve all the water, there is, as a general rule, very little precipitation until the following fall. This results, almost every year, in a shortage of water during the summer months. The plant of the Northern Ontario Power Company at Ragged Chutes on the Montreal River, has a capaeity of over 3000 h.p. It is lower down on the Montreal River and has 600 square miles more drainage area than the plant of the Great Northern Power Company, and in addition has storage in Lady Evelyn Lake. During periods of low water, however, the capacity of this plant has fallen to 1000 h.p., and unless the Great Northern Power Company has a large storage capacity it may suffer from the same conditions.

A London View of Canadian Mines.— J. H. Curle's recent artiele, regarding the apathy of English investors towards Northern Ontario gold mines, has aroused a great deal of interest and comment. Mr. Courle was of the opinion that next to the Rand the most important gold mining area of the near future would be Northern Ontario, and he appealed to the mining companies in London to participate in these mines. An English viewpoint is that our method of organizing companies does not appeal to the English investor. It is stated that our properties are capitalized for large sums, with the vendors taking a large proportion as purchase consideration, leaving the remainder to be issued at a discount for the purpose of providing funds to explore the properties, and it is suggested that we should change our methods in order to attract English capital. The methods of financing companies, to which this Englishman objects, certainly have disadvantages, but they appear to be suitable to this country and to the conditions in the United States and Canada, from which most of the capital is derived. It would appear to be better for the English interests to get in early and then they could adopt any scheme they liked that would be more suitable for the English investor.

Shining Tree Consolidation.— At a recent meeting of the newly organized Shining Tree Consolidated Mines Company, it was decided to purchase shares in several companies, on an exchange basis, as follows:—

1 Shares of Consolidated for 4 shares of Wakenda, Algonquin, West Tree and Wasapika.

1 Share of Consolidated for 2 shares of Atlas and Churchill.

2 Shares of Consolidated for 3 shares of the Miller-Adair.

Shares in the Buckingham Mines are also to be taken up by the new company. The Shining Tree Consolidated and practically all companies operating in the West Shining Tree field, are making extensive use of Dr. Harvey Weed's report on several of the mines. It is to be noted, however, that while these reports are extensively referred to, they are not quoted, and the casual reader would gather the impression that Dr. Weed had whole-heartedly endorsed the several properties he had examined. While it is probably going too far to allege misrepresentation, there is no question that Dr. Weed is inferred to have reported much more favorably than he did. In one case in particular, while Dr. Weed's report advised a limited expenditure, he does not show that either by diamond drilling or on the surface any commercial ore-body has been found, and he advises further work solely on account of some very spectacular ore that has been found in small quantities.

Porcupine.— The Vipond is understood to have made a good discovery on the 1000-foot level, where it is reported that 8 feet of $32.00 ore has been cut.— The Goldale is continuing development and exploration work on the 500-foot level, and is getting encouraging results. No ore in commercial quantities has yet been found but it is thought that the drifts may be on the apex of an ore-body.— Thompson-Krist shareholders have decided to re-purchase the company's claims from the Porcupine Mines. The latter company was formed to take over and operate the Thompson-Krist and the Porcupine Crown.

Kirkland.— At the recent meeting of the Teck-Hughes, which was held in New York, no announcement was made regarding the retirement of the bonds or the commencement of dividends. It was stated that these were matters which would be dealt with at a directors'

meeting. Developments at the property continue to be favorable and the new ore on the 700-foot level was stated to be the best that has yet been discovered in the mine, and it was thought that the possibilities with depth were very good.

NORTHWESTERN ONTARIO

Activity at Mikado Mine.—Christmas finds the lake of the Woods wearing its accustomed garb, and with ice strong enough to carry a load. Work is going on at the Mikado, with seventeen men or so working underground and another half dozen filling a cord-wood contract. With this exception there is no actual mining in progress. Yet it may be that one or two properties will make a start next spring. Mr. Charles Brent, an old-timer in the district, has been here, and rumor says he was engaged by Buffalo capitalists to look over the state of affairs at the old Scramble and Champion mines, and to ascertain whether power could be obtained from the Backus-Brooks outfit, and at what cost. Brent himself made no statements, excepting that he expected to be back next spring.

Red Lake Claims.—One hundred and fifty claims in all were staked in the Red Lake district last autumn. No one is there now, but a good deal of assessment work will be done after open water. Mr. Stanley McLeod discovered a very large body of low-grade ore, not more than a couple of thousand feet from the discovery claim, from which much is hoped. If it should prove to have promise, after a little more testing, McLeod has plenty of capital behind him, enough to put a railway in should that be deemed advisable.

Gold at Red Lake.—The concensus of opinion is that Red Lake is a gold district with silver as a minor accessory; it seems to have been by a mere freak of chance that the white metal was the first to be discovered. The original find, in any case, is apparently a small matter, of little commercial importance, by comparison with later discoveries of the more precious metal.

NOVA SCOTIA

Co-operative Settlement of Disputes not in Favour.—Not being satisfied that the workmen of the Sydney Steel plant were averse to co-operating with the Company in carrying on business, and settling disputes arising in the progress of work through a Workmen's Committee, it was decided to take a plebiscite on the question in the steel plant. This was done last week and the vote stood 1000 for the measure and 1500 against it. This does not necessarily mean, however, that the workmen are in favor of One Big Union, as repeatedly stated by the extreme wing of the Labor party. It is simply a pronouncement against the new principal of Industrial Co-operation proposed by Superintendent Bischoff. It is regrettable that his proposal, which looked towards a peaceful settlement of disputes and working together along lines leading to successful operations at the steel works for the good of the community, should be set aside. That this should be accomplished by the action and agitation of would-be leaders of the people who fear that sane rather than insane methods should characterize the affairs of the steel workers, gives food for thought. With 1000 men employed who fully believe that the steel industry will thrive best by an open recognition of the identity of interest between labor and capital, there is a guarantee of success, no less great than that achieved by Gideon's little army of 300, after it had been relieved of its chaff through the winnowing process of its leader. May we not look for like results in this case?

Iron Mine Unwatered.—Dominion No. 3 Mine, Wabana, Newfoundland, lately put into operation, contained 43,000,000 gallons of water last June. On the 26th of that month the work of pumping out the mine began and was completed on September 30th. Only one pump, No. 5 three stage Cameron horizontal type centrifugal, was used.

Iron Ore for Export.—The iron ore trade from Newfoundland to Europe was very good during the year just ending. It is understood that a much larger amount of ore will be shipped to European ports in 1923. For the purpose of putting a better quality of ore on the market, free from refuse material, additional picking belts will be installed, and those now in use be made wider. The Dominion Iron and Steel Company is doing its utmost to give the best quality of material to its customers.

The Steel Plant.—The best indication of the prosperity at Sydney Steel plant is the blowing in of the third blast-furnace and the increase in the force, which now numbers 3200 workmen.

Coal Shipment from Louisburg.—The Louisburg coal piers are now in good condition, having undergone extensive repair. They will be equal to the large amount of coal passing over them during the winter.

BRITISH COLUMBIA

The Late J. D. Mackenzie.—To mining men of British Columbia generally, and in particular to members of the British Columbia Branch of the Canadian Institute of Mining & Metallurgy, the news of the death of J. D. Mackenzie, head of the Canadian Geological Survey in this province, in a Montreal hospital on December 15th last, was received with feelings of deep regret. It is not enough to say that Mr. Mackenzie was popular in the west. All who knew him appreciated him as a competent official and as a genuine man. He took a leading part in the proceedings of the last annual meeting of the Canadian Institute of Mining & Metallurgy held at Vancouver in November. In debates his voice was listened to with close attention and his views carried great weight. In the lighter moments of the meeting, when members were assembled for amusement solely, his was one of the central and most popular personalities. Although possessed of strong convictions he made few enemies and made many real friends. His death is a distinct loss to the mining fraternity of Canada and especially to the Province of British Columbia where he had been occupied professionally since returning from the war. Mr. Mackenzie was 31 years of age, was born in Cape Breton, put himself through the Massachusetts Institute of Technology, became attached to the Canadian Geology Survey, and volunteered [illegible] front as a private in the 185th Cape Breton Highlanders. He had a distinguished career overseas, rising to the rank of Captain, receiving the Military Cross, and finally being invalided as a result of a machine gun wound. It was the latter that caused his death, for it never completely healed. He married in British Columbia Miss I. M. Lord, of New Westminster, who served overseas as a nurse. The last work he did in the West was a geological survey of the coalfields of Vancouver Island.

No Action on Steel Company Proposal.—The British Columbia Legislature has prorogued without passing enabling legislation in connection with the Government's undertaking to guarantee the bonds of the Coast Range Steel Ltd. up to $4,000,000 providing the Dominion and Imperial Governments do likewise. Premier Oliver and his colleagues are on record as being willing to assist, to the extent indicated and under the conditions intimated, in the establishment of an iron and steel industry in the Province. The position was taken, however, that lacking more definite word from the Federal and Imperial authorities the time was not opportune to ask the Provincial Legislature to take action. It also was pointed out that considerable money is being spent by the Province in the exploration of its iron ore resources and that it would be well to await detailed reports of the result of this work.

Promising Silver Property.—The Slocan Silver Mines Ltd., R. A. Grimes, manager, has installed on the "McAllister" property, Three Forks, a Pelton wheel and a compressor. A 1500-foot crosscut is being driven, designed to give 450 feet additional depth on the vein, the principal ore shoot of which is 700 feet in length in the present workings. It is stated that the McAllister will prove one of the important Mines of the Interior if the crosscut refers to accomplishments what the management expects.

Cold Weather Freezes Concentrator.—The Alamo concentrator, Alamo B. C., Clarence Cunningham, manager, has been closed down temporarily owing to a spell of exceedingly cold weather. With the thermometer 14 degrees below zero at Alamo the hoist became unworkable, the water freezing at the valves.

The Sheep Creek Gold Deposits.—Connection has been established between the workings of the Nugget and the Motherlode Mines, Sheep Creek, through the new workings on the former property, Dominion Mountain. Superintendent Lakes states that a complete change in methods of operation will follow, the camp being moved from the Motherlode to the other side of the mountain, adjacent to the old Nugget tunnels. Here there is a large quantity of milling ore, which will be stoped out and transported through the Motherlode workings to the mill. The mill was shut down in November. It will be re-opened next summer.

Fuel Oil Cheaper than Coal.—An effort was made during the British Columbia Legislative Session, which has just closed, to amend the coal Mines Regulation Act in order that the coal miners might appoint representatives on Gas Committees other than from their own numbers. They wanted the privilege of nominating outside men. The majority of members of the House, however held that such latitude might lead to abuses that would seriously affect the industry, and the amendment was defeated. In the debate, attention was drawn to the serious results of the large importations of fuel oil into the Province from the United States. It was said that 90,000 tons of British Columbia coal per month was being driven from the local markets. Local coal was unable to meet the competition. One large mine already had been closed down on Vancouver Island and the time had arrived for the Dominion to impose a heavier duty on fuel oil coming from outside in order that the provincial coal industry might be saved.

The known iron ore deposits of China have a reserve supply of 700 million to 1000 million tons, which is about one-quarter the reserves of the United States, or four fifths those of Great Britain.

There are at present 275,000 producing oil wells in the United States, owned by 14,000 different interests, and the approximate output per day is 1,500,000 barrels.

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